Managing risk; how doctors, nurses and pharmacists optimise the use of medicines in acute hospitals in Northern Ireland: a grounded theory study.

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Submitted for the degree of Doctor of Pharmacy

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2018

Abstract
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Managing risk; how doctors, nurses and pharmacists optimise the use of medicines in acute hospitals in Northern Ireland: a grounded theory study.

Keywords: Managing risk, medicines optimisation, healthcare professionals, acute hospitals, grounded theory.

Medicines optimisation requires healthcare professionals to work collaboratively to meet the medication needs of patients.

A grounded theory was produced which explains how doctors, nurses and pharmacists work to optimise the use of medicines in acute hospital settings in Northern Ireland. Seventeen semi-structured, one-to-one interviews were conducted with doctors, nurses and pharmacists. Concurrent data collection and analysis was carried out using coding, particular to grounded theory, adopting a constant comparative approach, writing memos and using theoretical sampling as described by Strauss and Corbin (1998).

The core category was *managing risk*. Participants had an implicit understanding of the need to continually manage risk when *working with the complex and the routine*. They used personal and systemic *checks and balances* which could be viewed either as duplication of effort or indicative of a culture of safety. Multi-professional interdependencies and support for new, professional, non-medical roles were highlighted. *Working together* was a further strategy to *ensuring each patient gets the right medicine*. Establishing an agreed framework for working with medicines at ward level could support the safer use of medicines.

It is anticipated that this theory will contribute to the design of systems involved in medicines use in acute hospitals in Northern Ireland.

Acknowledgements

I would like to thank my supervisors Dr Beverley Lucas and Professor Alison Blenkinsopp for their guidance and support through the research process. I have gained a greater understanding and love of research under their expert care and hope to be able to further develop and practice my research skills. I also thank them for their practical advice and time.

I would like to thank my managers, Geraldine McKay and Geraldine Hillick (Directors of Acute Hospitals), and Chief Executives Dr Anne Kilgallen and Elaine Way for their encouragement and interest. I also thank my Pharmacy Senior Management Team and my Administration Manager Lorraine Andrews for their ongoing support. Thank you also to Brenda Quinn for transcribing the interviews.

Thank you to the doctors, nurses and pharmacists across Northern Ireland who gave up their time to participate in the study, as well as the Trust Heads of Pharmacy and Medicines Management and Research Pharmacists who acted as gatekeepers for the study and the staff from Trust Research and Development offices who supported me in getting research ethics approval.

Thank you also to the Northern Ireland Centre for Pharmacy Postgraduate Learning and Development (NICPLD) and the Western Health and Social Care Trust for part- funding this research.

I would particularly like to thank my father John, mother Celine and sister Karen for all of their help in getting me to this stage. Their love, encouragement and thoughtful support have been invaluable. Thanks also to my friends for their great patience!

Finally, I would like to thank the Capuchin Friars and staff at Ards Friary, Creeslough, County Donegal for providing a reflective space and wonderful food when I needed it.

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Glossary of terms

AKI	Acute Kidney Injury
BNF	British National Formulary
C diff	Clostridium difficile
COPD	Chronic Obstructive Pulmonary Disease
Critical Medicines	Medicines for which timely administration is crucial
CT4	Core Trainee year 4
ECR	Electronic Care Record
FY1 / F1	Foundation Year doctors, in their pre-registration year
GFR	Glomerular Filtration Rate
GPSI	General Practitioner with a Specialist Interest
HRO	High Reliability Organisation
IMM	Integrated Medicines Management – a ward-based medicines system involving pharmacists and pharmacy technicians in Northern Ireland
Kardex	Hospital inpatient prescription chart
Medicines reconciliation	Process of creating the most accurate list of medicines a patient is taking

Medication review	Critical examination of a person's medicines with the objective of reaching agreement, with the person about treatment, optimising the impact of medicines, minimising the number of medication-related problems and reducing waste
Mid-line	A short, fine, hollow tube which is inserted into one of the large veins in your arm, usually in the bend of the elbow, through which certain intravenous drugs can be administered.
NMPs	Non-medical prescribers.
NOAC	Novel Oral Anti-Coagulant drug.
PEG	Percutaneous Endoscopic Gastrostomy.
PRN	When required.
Sando K	Oral potassium supplement.
Specialty Doctor	A senior, career grade doctor working in a hospital.
Registrar	A junior doctor who has completed their foundation training but is still in training in a specialty area of medicine.
Therapeutic drug monitoring	Monitoring blood- levels of drugs with a narrow therapeutic index to ensure patients receive a safe and effective dose.
UTI	Urinary Tract Infection.

1.0 Introduction

The purpose of the first chapter in a thesis is to introduce the research (Evans *et al* 2014). This chapter will establish the initial context in which the study was carried out, state the aim and scope of the research and its significance within Health and Social Care in Northern Ireland.

1.1 Establishing the context

This research was prompted in 2015 by the recent introduction of the term, “medicines optimisation.” I was interested in developing a theory to explain how different healthcare professionals worked to use medicines effectively in acute hospitals. This would act as baseline information to inform the future design of a safe process for optimising medicines use in hospitals which would ensure best patient outcomes.

The planning for this study began at the same time as the Department of Health in Northern Ireland published its policy document, the Medicines Optimisation Quality Framework (2016). The Framework described the Northern Ireland approach to medicines optimisation, a term which had just superseded “medicines management” to describe the use of medicines in healthcare settings.

1.1.1 Medicines management

Medicines management is defined as the process which, “encompasses the way medicines are selected, procured, delivered, prescribed, prepared, administered, stored and reviewed to optimise the contribution they make to producing informed and desired outcomes for patient care” (Audit Commission 2001).

The Audit Commission document, A Spoonful of Sugar (2001), described an urgent need to improve medicines management systems in acute hospitals. It

highlighted professional barriers to change such as some doctors and nurses having, “neither the will nor incentives to change traditional ways of working” (2001:6), serious staff recruitment and retention problems and hospital pharmacists being content with their traditional dispensing roles.

The Royal Pharmaceutical Society (RPS) has just published its Professional guidance on the safe and secure handling of medicines (2018). The document provides guidance for all health professionals on how medicines should be handled. It has been endorsed by a number of professional organisations including the Royal College of Nursing, the Royal College of Anaesthetists and the Royal College of General Practitioners. This inter-professional collaboration shows that healthcare professionals are working more closely together with respect to managing medicines, which involves a series of tasks carried out by doctors, nurses and pharmacists.

1.1.2 Medicines optimisation

Medicines optimisation is defined as, “a person-centred approach to safe and effective medicines use to ensure that people obtain the best possible outcomes from their medicines” (NICE 2015). The recent change to medicines optimisation built on the medicines management theme, ensuring a focus on patients, getting best outcomes from medicines and shared decision making involving patients and healthcare professionals. In its good practice guide, the RPS described medicines optimisation as, “a holistic approach, an enhanced level of patient centred professionalism, and partnership between clinical professionals and a patient” (2013:3). This guide highlighted that healthcare professionals will need to work together to, “individualise care, monitor outcomes more carefully, review medicines more frequently and support patients when needed” (RPS 2013: 3).

This change from systems-based medicines management to the more personal and outcomes-focused medicines optimisation may challenge healthcare professionals’ perceptions of their roles and belief systems

relating to medicines. The literature relating to this at the outset of the study will be discussed in Chapter 2.

1.2 Personal statement of the problem

In parallel to the above, my personal, initial incentive for looking at the roles and approaches of different healthcare professionals was an insight which I had when talking to a consultant in my role as Trust Head of Pharmacy and Medicines Management. We were discussing a recent audit, from which one of the recommendations for Trusts was to issue guidance on where drug administration should be recorded. To me, the solution was clear however the consultant had a different view. We spent some time together, working through different examples and reviewing the paperwork. We eventually reached a solution which met the recommendations of the report. However I was struck by how differently we thought about and addressed this problem, each having the same goal of patient safety in mind. I was interested in exploring this further.

I am accountable for the safe management of medicines in a Health and Social Care Trust and I acknowledge that this, “positions me in my writing” (Creswell 2013: 216). It is important that I ensure reflexivity in this work. I have included a reflexive personal statement in Appendix 1.

1.3 Aim and scope of the study

The aim of this study is to produce a theory of how doctors, nurses and pharmacists work to optimise the use of medicines in acute hospital settings in Northern Ireland (NI).

Initial research questions included:

- Do healthcare professionals work to optimise the use of medicines?
- What is each healthcare professional’s contribution to working in a team to optimise medicines use?

- Why do they work in this way?
- How do individual healthcare professionals define their role with medicines?

The scope of the study incorporates the work solely of doctors, nurses and pharmacists who were working in acute hospitals across Northern Ireland at the time of data collection. Other healthcare professionals sit outside the scope of the work.

By using qualitative methodology, the findings from this study will not be reached using statistical methods. Data on the lived experiences of the participants will be collected. Whilst results may not be statistically significant and therefore generalizable, it is planned that through rigorous and transparent study design, the collection and analysis of data and the generation of theory, that the findings will provide key insights into how doctors, nurses and pharmacists work to optimise medicines across acute healthcare in the United Kingdom.

1.4 Significance of the study

The safe and effective use of medicines is a global concern. The World Health Organisation recently identified, “Medication without Harm,” as its theme for the third global patient safety challenge (2017). This challenge prompted the United Kingdom’s Secretary of State for Health and Social Care to establish a Short Life Working Group to report on, reducing medication-related harm. The Working Group recommended further development of technology solutions such as electronic prescribing, establishing support to encourage patient-involvement in shared decision-making about their medicines with clinical staff, improved training for healthcare professionals on the safe and effective use of medicines and a need for further research, making explicit evidence of good practice (Department of Health and Social Care 2018).

Lord Carter of Coles' independent report for the Department of Health, Operational productivity and performance in English NHS acute hospitals: unwarranted variations (2016) had a particular focus on efficiency and productivity of hospital pharmacy. It recommended that hospital pharmacists should spend the majority of their time in patient-facing roles, prioritising medicines optimisation and developing pharmacist prescribing. The expertise of pharmacy should be harnessed in helping with patient flow, including working across transitions of care to ensure safer patient transfers. Subsequently a Hospital Pharmacy Transformation Programme has been put in place.

In Northern Ireland, the Department of Health's Medicines Optimisation Quality Framework (2016) sets the policy steer for the use of medicines across all sectors. It is underpinned by the Department of Health's Medicines Optimisation Regional Efficiency Programme. These documents reflect the changes seen in NHS England and Wales.

These medicines-related changes come in the wake of reports into patient safety in the National Health Service. The Report of the Mid Staffordshire NHS Foundation Trust Public Enquiry (Francis Report) was published in February 2013. In this report, Francis made a number of recommendations which focused on prioritising patients' needs, using standards which everyone can understand and against which performance is measured and ensuring there is an open and transparent culture.

Sir Bruce Keogh (2013a), in his review into the quality or care and treatment provided by fourteen NHS hospital trusts, highlighted the importance of professionalism, leadership, staff engagement with respect to mortality rates, seeing junior doctors as the leaders of today and not working in professional/academic isolation.

In November 2018, the Government published its response to the Report of the Gosport Independent Panel (Department of Health and Social Care 2018). This report laid out the findings following an investigation into patient

deaths at Gosport War Memorial Hospital (GWMH) between 1988 and 2000, with an emphasis on finding the truth of what happened for the families affected. In its response, the Government made a number of recommendations relating to duty of candor, the use of controlled drugs, having a, “culture that listens, learns and challenges,” as well as a number of recommendations relating to future case investigations and the role of healthcare regulators.

In Northern Ireland, the Department of Health’s strategy, Quality 2020 was launched in 2011, with a focus on improving quality in Health and Social Care in the Province. The strategy defined quality under the headings of safety, quality and patient and client focus. It also highlighted the need to ensure health and social care operated with values such as empowerment, involvement, respect, partnership, community, continuity and equity.

The Donaldson Report, The Right Time, the Right Place (2014) looked at the application of Health and Social Care (HSC) governance arrangements in Northern Ireland. The Report stated that the greatest risk to safe patient healthcare comes from the way the system as a whole is designed and operated. It particularly highlighted the important role which pharmacists must play in the future with respect to the safe and effective use of medicines.

Systems not Structures, Changing Health and Social Care (in Northern Ireland), was published in 2016 by an expert panel chaired by Professor Rafael Bengoa. The first recommendation of the panel was that, reform would place, “an increased emphasis on the experience of those who deliver care” (2016:8). This key document is being used as a roadmap for transformation of Health and Social Care (HSC) services in Northern Ireland.

In May 2016, the Northern Ireland Medicines Optimisation Quality Framework was published (Department of Health, Social Services and Public Safety). This Framework built on earlier work on medicines optimisation (NICE 2015) and provided a regional approach to the use of medicines in hospital, general practice, community pharmacy and social care. It described the service which patients can expect in each of these settings with respect to medicines. It

emphasised the multi-professional nature of this work, with input from pharmacists in each area and a focus on delivering best practice that is co-designed with patients. The framework is aligned with the themes of safety, effectiveness and patient and client focus seen in Quality 2020.

This work has to be set within the financial situation where the primary care cost of medicines per head of population in Northern Ireland exceeds that in the other three home countries - £249 per head in Northern Ireland compared to £172 per head in England (Black 2014). A Department of Health-led Medicines Optimisation Regional Efficiency Programme (2016) is in place to deliver upon value for money and efficiencies with respect to medicines use.

This is a time of change within Health and Social Care in Northern Ireland. At the outset it is important to understand what is currently happening within acute hospital practice. This information can be used both as a baseline measure for future comparisons as well as to inform next steps in moving forward in transforming the service for patients.

I believe that there is a need for a theory which defines how healthcare professionals work with medicines in acute hospitals. When scoping out the aim of this research, I have spoken to a range of healthcare professionals within the hospital setting and the Department of Health in Northern Ireland to test out the relevance of this study.

1.5 Summary

In this first chapter, I have established the initial context for carrying out the research, making specific reference to the change from a systems-based medicines management approach to a more patient-focused medicines optimisation strategy. I have stated the aim and initial objectives of the study and highlighted its significance within the World Health Organisation's global focus on medicines safety, making reference to the related governmental policy context in the United Kingdom, with particular focus on NHS England and Northern Ireland.

2.0 Literature review

2.1 Introduction

In this chapter, I will outline the purpose of a literature review. I will identify the place of the literature review in a grounded theory study, making reference to carrying out both, an initial, and non-committal, outline literature review at the start of the study and a second, more detailed review following emergence of the theory.

I will highlight the importance of being able to review the literature in a systematic manner, how that was carried out in this study and the approach taken to critically analysing the literature. Finally, I will lay out the initial literature review which was carried out at the start of the study.

2.2 The purpose of a literature review

The purpose of a literature review is to investigate what other researchers have found, as well as the methods they have used. It also helps in identifying potential gaps in knowledge to be targeted in the design of a given study (Wisker 2008). New research can then link with and reinforce the findings of the current literature in the field as well as extend it.

Wisker (2008:170) described the researcher as, “engaging in dialogue” with the literature as opposed to stating facts. This should be an ongoing dialogue with the researcher adopting a rigorous approach to updating literature searches and synthesising the information (Evans *et al* 2014). Afolabi (1992) stated that the important elements of a literature review are, “describing, criticising and relating.” This includes summarising the key elements of a paper as well as laying out its strengths and weaknesses. Therefore the process starts with initially summarising the literature and then synthesising and integrating it into modifying the researcher’s own work (Holloway and Walker 2000).

The literature review conducted early in a doctoral study serves different purposes in quantitative and grounded theory studies, with the latter generally referred to as an, “initial literature review” (Holloway and Walker 2000:91). This is not as wide, detailed or structured as the literature review which informs a quantitative study.

2.3 The literature review in grounded theory studies

It is noted that in classical grounded theory, the theory is derived from the data gathered, as opposed to testing a pre-determined theory from an initial literature review. Whilst an initial, in-depth literature review of the subject is frowned upon, an awareness of the literature can help in a number of ways (Corbin and Strauss 2008). These include justifying a gap in the current research and providing questions for early interviews, thus supporting research and ethics submissions; signposting questions during data analysis, improving sensitivity and possibly confirming outcomes (or not!).

Grounded theory is not concerned with proving or disproving a particular theory or null hypothesis (Urquart 2013). The place of the literature review in grounded theory methodology has been a controversial subject (Urquart and Fernandez 2006; Urquart 2013). Glaser and Strauss, in their seminal work, the Discovery of Grounded Theory (1967), commented that the literature should not be reviewed until after data collection, analysis and theory generation. Glaser and Strauss however also stated that the researcher will not begin the work as a blank slate (‘tabula rasa’ 1967:3), but will have a, “perspective that will help him see relevant data and extract significant categories” (1967:3). This footnote to the text is often ignored in the discussion of the appropriateness of an initial literature review. Glaser (1992) later explained that the authors were concerned that such an early literature review may impede the researcher from truly generating theory from the data.

Urquart (2013) defined a delayed literature review as being carried out after the theory has emerged. This allows the researcher to discuss the new theory in the context of the current literature. It serves a number of purposes including demonstration of the credibility of the theory, identifying new theory and fulfilling the academic requirements for doctoral study. Urquart explained that the grounded theorist is obligated to review the literature at this later stage.

Martin (2006) highlighted carrying out the literature review, using two phases. The first is a “non-committal” review which supports the researcher in developing theoretical sensitivity and pinning down the research problem. The second is an “integrative” literature review where the new theory is integrated with the current literature in the field, resulting in a theory of greater value. This approach allows the researcher to be true to the ethos and approach of especially the earlier grounded theorists and also to meet the academic requirements of their doctoral studies. Therefore, I adopted this approach to reviewing the literature in this research.

2.4 Theoretical sensitivity

Theoretical sensitivity was defined by Strauss and Corbin as, “the ability to respond to the subtle nuances of, and cues to, meanings in data” (1998:35). The researcher needs to maintain a balance between remaining objective and adopting a reflexive approach but also understand the nuances of and language used in the field. Sensitivity can come from both a professional or personal experience of the subject area, against which the researcher can view, “the range of meanings given by others” (Strauss and Corbin 1998:48). The timing of reviewing the literature in a grounded theory study is discussed in this chapter. The use of a preliminary literature review in,” acquiring and developing theoretical sensitivity” is controversial (Thistoll *et al* 2016). The latter can be dealt with by carrying out an extensive review of the literature after data collection analysis and emergence of the theory. This allows the researcher to situate the theory within the current body of knowledge and

critically discuss it in light of the current literature. This will identify new findings from the research which is a key doctoral criterion.

The researcher will rarely begin their work with no understanding of the research area. This is the case in this study where the researcher is the Head of Pharmacy and Medicines Management in a Health and Social Care Trust in Northern Ireland. It is important that a balance between having theoretical sensitivity and using that knowledge to completely shape the theory, ensuring reflexivity is adopted and this will be discussed in Chapter 3.

2.5 Search strategy

It is important to be able to demonstrate the ability to adopt a systematic approach to reviewing the literature in doctoral research (Holloway and Walker 2000). The most frequently used method is searching on-line databases such as Medline, CINAHL and EMBASE. These require the use of relevant search terms and act as an efficient and comprehensive approach to accessing relevant papers. It is advisable to devise a search strategy which demonstrates a structured approach and is kept up-to-date. Researchers should also devise a method of summarising and storing relevant references for future use. I have included the search strategies used for both the initial and detailed review in Appendices 2 and 3.

Evans *et al* (2014:52) used the analogy of, “gateways and paths” in describing a particular, systematic way of reviewing the literature. This recognised that using on-line databases will not yield all of the relevant literature due to the lack of uniformity of search terms both between databases and with respect to the literature itself. The gateway in the analogy is a relevant research paper and the paths included the references listed by the authors as well as the key words cited. Paths can also include the subsequent studies which have cited a particular reference. I found this approach particularly helpful in finding additional relevant papers as well as becoming more aware of the wider literature surrounding a subject and the key authors working in the field.

2.6 The approach taken in this study

In line with the approach outlined by Martin (2006) and Urquart (2013), I carried out two literature reviews. The first was completed at the outset of my work, when I was writing my research proposal, to establish a research problem and then demonstrate that my work would address a gap in the literature. This was not a detailed literature review but provided justification for the research and yielded some headings which I could use in initial interviews. The search strategy which I used can be seen in Appendix 2.

The second literature review was more detailed, was conducted after data collection, analysis and theory development were completed and was used to integrate the new theory with current knowledge in the field (Martin 2006). I used different search terms and accessed data on a number of different topics compared to the first search, as the latter did not prove to be wholly relevant to the theory which had emerged. The search strategy for this second, integrative literature review has been included in Appendix 3.

I did not access the literature in the area of research until after the data was collected, analysed and the theory had emerged. This approach is in line with the original view of Glaser and Strauss (1967). This required an element of discipline and a reflexive approach, as I work with healthcare professionals in acute hospitals each day to ensure medicines optimisation. I have been part of professional discussions of the subject; however I did not conduct a detailed literature search. My success in this was evidenced by my experiencing a complete gear-change in my thinking from collecting, analysing data and developing theory to beginning to relate this theory to the literature.

To demonstrate that I had searched and reviewed the literature using a systematic approach, I used the PRISMA flow diagram to map out the process which I followed for both literature searches (Liberati *et al* 2009). The completed PRISMA flow diagram for each literature search has been included in Appendices 2 and 3 along with the relevant search strategies.

2.7 Critically appraising the literature

Greenhalgh (2006) commented that designing a tool to critically appraise qualitative research papers would be a challenge, although she listed some examples (Giacomini and Cook 2000a, Giacomini and Cook 2000b, Horsburgh 2003). Other authors believed that the use of a rigid checklist to evaluate a qualitative paper could force researchers to adopt a rigid approach to their work (Barbour 2001).

I assessed the quality of the papers used to discuss my findings using a six-point, quality checklist for qualitative studies revised from standardised tools by Mukadam *et al* (2011). Quality scores, along with descriptors of the key papers accessed, are summarised in Appendix 4. Primary literature was used, although this was challenging to find for some widely accepted approaches such as those on High Reliability Organisations as well as the work on error by Reason (2000).

I have incorporated a critical review of some of the key papers found as a result of the second literature search in Section 7.4.

2.8 Initial review of the literature

With the above approach in mind, an initial literature review was carried out before I began the research, using the search strategy outlined in Appendix 2. This indicated a gap in the literature. The main themes found in the literature at this stage included concerns relating to medicines management and optimisation (described in chapter 1), perceptions of healthcare professionals' roles and new ways of working with respect to medicines. I will elaborate on the latter two themes below.

2.8.1 Perceptions of healthcare professionals' roles with respect to medicines

There is a range of literature on how healthcare professionals perceive each other's roles as well as on collaborative, multidisciplinary working but little on how they perceive their own roles.

Neufeld *et al* (1998) described the differences in opinion in expectations of doctors' performance between doctors and other healthcare professionals, with particular reference to responsibility and power of doctors within the overall system.

Ray (1998) defined interdisciplinary (as opposed to multidisciplinary) patient care where there is equal input into decision making. He described professions having overlapping roles where there was shared knowledge and interests. Pharmacists working in such a way must have a number of attributes including being confident and competent, contributing to setting objectives for patient outcomes with respect to medicines and understanding team working.

The World Health Organisation defined inter-professional collaboration (2010) happening when a range of healthcare professionals work together with patients, families, carers and communities to provide high-quality care. Stringer *et al* (2013:3) highlighted work to explore pharmacists' expectations of the competencies of family practitioners in Canada with the goal of improving inter-professional collaboration (IPC) between the two groups through, "joint understanding of our competencies." Lapkin *et al* (2013) described how identifying roles and expectations are experienced as barriers. Drinka and Clark (2000) stated that in clinical practice, healthcare professionals needed to be able to describe their own competencies to others and also have a sense of others competencies with respect to their own insight into how they and other healthcare professionals think.

Gillespie *et al* (2012) evaluated perceptions of the benefits of ward-based clinical pharmacists in Sweden from GPs, hospital-based physicians and nurses. Benefits such as enhanced patient safety and better drug therapy were highlighted with advice accepted more often when it was presented during inter-professional team rounds. The authors described the challenges of forming such teams due to the transient nature of physicians.

Elvey *et al* (2013) looked at how pharmacists perceived their own professional identity and how others viewed pharmacists. Hind *et al* (2003) identified how students from healthcare professions perceived each other's roles. The roles of community pharmacists and relationships with GPs have also been looked at (Lasselain 1991, Hughes and McCann 2003). However Elvey *et al* (2013:331) found that nine different identities were attributed to pharmacists. She determined that this high number may reflect, "role ambiguity and lack of clear direction and ownership." The clinical role of the pharmacist seemed to predominate in the hospital setting, although a hospital pharmacist described her, "discomfort with having to diagnose", preferring to work within a traditional pharmacist role.

Rixon *et al* (2015) looked at how healthcare professionals interacted with respect to medicines in hospital settings in Australia. They described pharmacists, nurses and doctors working beside each other as opposed to adopting true inter-disciplinary working with communication mainly focusing on solving particular problems. They saw differences between each professional group's attitudes towards managing medicines.

There is an emerging theme of the value of healthcare professionals understanding their own roles and abilities as well as those of others when working together and subsequently impacting on achieving good outcomes for patients. The use of a range of terminology in the literature to describe this working together may suggest that it does not follow a defined model – "multidisciplinary", "inter-collaborative", "inter-disciplinary" – and may not be team-working at all but a working alongside each other, carrying out discreet roles. The transient nature of medical teams may contribute to this (Gillespie *et al* 2012).

2.8.2 New ways of working

Over the last 18 years, there have been multiple changes in professional practice and regulatory responsibilities with respect to medicines. These have been defined in legislation as well as good practice guidance from professional bodies.

Pharmacy in the Future - Implementing the NHS Plan (Department of Health 2000) described significant changes in healthcare professionals' job design with respect to managing medicines.

The Audit Commission (2001) also mentioned concerns that the core medical curriculum did not provide an in-depth knowledge of how to prescribe and administer medicines safely.

The integrated medicines management (IMM) approach, developed in and adopted by hospitals in Northern Ireland, focused on providing evidence-based input from pharmacists and pharmacy technicians at admission, discharge and during the inpatient stay and has been shown to reduce hospital length of stay, re-admission rates and improve the appropriateness of medicines (Scullin *et al* 2007; Scullin *et al* 2011).

Nurses and pharmacists, and more recently optometrists, physiotherapists and podiatrists, can practice as non-medical prescribers. Buckley *et al* (2006) interviewed a range of individuals (clinical and operational) to determine how nurse and pharmacist supplementary prescribers would be perceived by patients and doctors as well as by each other. Participants were also asked if they believed pharmacists and nurses may wish to take on these new prescribing roles. In general, nurse and pharmacist supplementary prescribing was supported but within certain contexts, for example, writing discharge prescriptions and prescribing within defined protocols. Trust, team-working and competence were seen as important in supporting the role.

Independent nurse and pharmacist prescribing were not supported by medical staff. Participants felt that there would be intra-professional conflict between prescribing and non-prescribing nurses and pharmacists. Nurses and doctors perceived pharmacists as being removed from the patient, with this concept being seen as a barrier to improved patient outcomes. A functional role of a pharmacist writing discharge prescriptions (more a transcribing role) was supported by nurses.

The Health and Care Professions Council (2011) explored views on professionalism in healthcare professionals. The report summarised that, professionalism may be better regarded as a, “meta-skill, comprising situational awareness and contextual judgement, which allows individuals to draw on the communication, technical and practical skills appropriate for a given professional scenario” (2011:3). It may be helpful to focus on my participants’ views of professionalism at the outset of this study.

2.9 Summary of the initial literature review

In summary, the dynamics of how healthcare professionals interact and the roles they carry out have changed in both a planned and unplanned way over time. These changes have happened within professions with changes to professional codes of practice, legislation and regulation and the gradual development of new roles, especially for non-medical healthcare professionals. At the same time, medical students received less training on pharmacology and the use of medicines (Audit Commission 2001). Simultaneously the acuity of patients being cared for in hospital has increased with each patient taking increased numbers of medicines. The traditional consultant-led team structure has changed following the implementation of the European Union Working Time Directive and this has changed the way doctors work and learn. All of this change presents challenges in ensuring patients get high quality and safe care from a team of healthcare professionals who are competent, clear about their role and the roles of others.

I will use some of the themes identified in the literature to inform my initial interviews. These themes include professional barriers to change, traditional boundaries, changes in education, the transient nature of teams, professionalism and a joint understanding of each other's roles in using medicines. Whilst these are very specific, I will use broader, open questions using these overarching subjects (Appendix 5).

3.0 Methodology

3.1 Introduction

The Methodology chapter should lay out the research method which was used; explain why this particular method was chosen and how it was applied during the research process. The terms “methodology” and “method” should not be used interchangeably. Evans *et al* (2014) defined “methodology” as relating to the approach or stance taken by the researcher whilst “method” relates to the particular research techniques which were used.

In this chapter, I will describe how I designed this research project to meet the aim of the research and justify the choices made in both the methodology and methods used.

3.2 Research paradigm

In designing a research project, it is important to be aware of and describe, “the philosophical intent or motivation for undertaking a study” (Cohen and Manion 1994:23). This is known as a theoretical paradigm and examples such as positivist and post-positivist (which tend to relate to quantitative research), constructivist, interpretivist and transformative paradigms are discussed at length in the literature (Creswell 2013).

The motivation for undertaking this study is to inform the improvement and redesign of medicines optimisation and medicines management systems in acute hospital settings in Northern Ireland by listening to the experiences of doctors, nurses and pharmacists who work there. In doing this, I am conscious that I work within this environment. I wish to acknowledge this but also adopt a methodology which works through this fact, assuring credibility and rigor in the research. I will describe my philosophical intent further with respect to the methodology chosen in Section 3.4.

3.3 Research strategy

3.3.1 Introduction

A research strategy should be chosen based on the task in hand (Silverman 2010). It must be fit for purpose (Denscombe 2010) and chosen for its suitability, feasibility and ethical appropriateness. It must use a methodology and methods which will address the research questions being asked (Spencer *et al* 2003).

Creswell (2013) described three main research methodologies which sit along a continuum - quantitative, qualitative and mixed-methods approaches. In this section, I will define each of these and explain my decision for choosing a particular methodology.

3.3.2 Quantitative research

Quantitative methodology involves testing specific theories, using numbers and statistical analysis. Quantitative researchers use statistics in deciding upon a representative sample size, for example, in research which uses surveys or structured interviews to collect data. This allows findings to be generalised to a wider population. Experimental research builds in controls against which a new theory may be tested, for example, placebo-controlled or standard-treatment controlled trials, the choice of which is determined by ethical considerations.

Quantitative methodology traditionally has been the main and most respected research methodology until the development of qualitative research as a methodology in its own right from the 1960s and subsequently the adoption of mixed-methods (Creswell and Creswell 2018).

3.3.3 Qualitative research

Qualitative research has developed from being used to scope out the potential for what was believed to be more rigorous quantitative research to being a respected methodology in its own right. This has been helped by the interest in building rigor into qualitative methods as seen, for example, in the work of Glaser and Strauss with respect to grounded theory (1967) and as detailed by Mays and Pope (2000).

Qualitative methodology is chosen when the research is focusing on the meaning from peoples' lived experiences, using an "interpretive" analysis. This is used to, "'discover concepts and relationships in raw data and organising these into a theoretical, explanatory scheme" (Strauss and Corbin 1998:11). It can be used to provide a "thick description" of what is happening (1998:29), including an understanding of implicit ways of working (Holloway 2005). This methodology has been referred to as being both artistic and scientific in nature which can be challenging when evaluating the rigor of a study (Strauss and Corbin 1998).

Researchers can be involved in qualitative data collection to varying degrees, for example, by sharing an experience with participants in ethnographic studies to conducting interviews and focus groups, using methods to ensure that the researcher does not influence outcomes, for example "bracketing" in phenomenological studies. The role of the researcher in qualitative research has been the subject of much debate and varies, often depending on the world-view of the researcher. This can be seen, for example, in the different approaches to grounded theory methodology defined by Glaser and Strauss in 1967 (post-positivist) and later in the constructivist approach taken by Charmaz (2006). The qualitative researcher must be able to identify and reflect on their role throughout the research process.

3.3.4 Mixed methods research

Mixed methods research integrates the data obtained by using both qualitative and quantitative methods. This design is used when the researcher believes that the findings will be enhanced by such integration, with the limitations of each method being “neutralised” through their combination (Creswell and Creswell 2018:14).

Mixed methods researchers can take a number of approaches, for example, carrying out a quantitative study to inform further qualitative work or switching the timings, using qualitative methods first. A third commonly used design is known as, “convergent mixed methods” where data from the two methods is collected around the same time and integrated in the analysis of the results.

This form of research has been used more routinely in healthcare over the last twenty years.

3.3.5 Choosing a research methodology

The research methodology must address both the aim and purpose of the study (Creswell 2013). The aim of this work is to produce a theory of how healthcare professionals work to optimise the use of medicines in acute hospitals in Northern Ireland**.** The purpose of the research is to inform ways of improving medicines optimisation and management systems. This builds on the overall research aim, describing how the outcomes of the research will be used. This is important to establish when setting about any research study.

Initially I considered collecting data using a survey. Such a quantitative approach would allow me to collect data from a representative sample of doctors, nurses and pharmacists and generalise my findings to a wider population. However, from my experience, I wanted to determine the “essence” of how these healthcare professionals worked with medicines; to explore the different factors which impacted on their approach, understanding

the nuances and perceptions of each professional. Therefore I was not focusing on gathering numerical data but was seeking explanation and meaning from a group of individuals. This suggested the use of direct observation, interviews and focus groups, signposting a qualitative approach. Vivar *et al* (2007: 2) described qualitative research as drawing upon the, "meaning of human experience." I could have used mixed methods, but when scoping out the work, I did not believe that integrated data from two different methods would significantly enhance the findings. Therefore, I decided to use a qualitative approach.

Creswell (2013) stated that use of a recognised approach to research enhances the rigor and sophistication of the research design. He described five traditions of qualitative research: narrative, phenomenological, grounded theory, ethnographic and case study. In my qualitative study, I initially favoured naturalistic and ethnographic methods as they involved the direct observation of medicines optimisation processes carried out by healthcare professionals in the natural setting. However these were discounted as there was a potential to introduce bias into the study due to the researcher's presence. This could have been minimised by recording interactions between participants as carried out by other researchers in the field (Rixon *et al* 2015; Wilson *et al* 2016). However again this could have been intrusive on wards and may have had implications with respect to confidentiality and data protection. Also such approaches would require additional time in the field which may not have yielded proportionate additional benefits. The success of the case study approach revolves around selection of a particular case (Creswell 2013) and this focus may have ethical implications especially when the research is being carried out in the small geographical area of Northern Ireland. Therefore, I specifically considered grounded theory and phenomenology approaches.

3.3.6 Choosing a qualitative tradition

3.3.6.1 Grounded theory

Grounded theory is used to, “generate or discover a theory, grounded in data from participants who have experienced the process” (Corbin and Strauss 2008:107). The methodology was developed in 1967 by Glaser and Strauss and has been modified by, for example, Strauss and Corbin (1990; 1998), Charmaz (2006) and Corbin and Strauss (2008).

Through grounded theory, Glaser and Strauss (1967) moved away from the use of qualitative research solely to inform future quantitative work and added a rigor and structure to methodology which developed a theory as opposed to simply a description of the phenomenon. Interviews, often in-depth, one-to-one interviews, are used to collect data with analysis being structured, using specific coding procedures. The individual views of Glaser and Strauss differed with time and this resulted initially in two main schools of grounded theory – one of Glaser and another from the collaboration of Strauss and Corbin. Charmaz (2006), and other second generation grounded theorists, developed these further.

Despite the range of approaches, Charmaz listed the central components which demonstrate that a grounded theory approach is being taken. These are, “simultaneous data collection and analysis, analysis of actions as opposed to themes, using comparative methods, drawing on data to develop new conceptual categories and developing abstract, analytical categories through systematic data analysis” (2014:15).

Hill Bailey (1997) highlighted that the ontological and epistemological aspects, relating to a study depend on the researcher.

Markey *et al* (2014), in their work guiding researchers new to grounded theory, described the variety of grounded theory approaches and the importance of novice researchers determining their own research beliefs to help them to choose the most appropriate approach.

The main epistemological stances are objectivism, subjectivism and constructivism (Markey *et al* 2014). Objectivism suggests that "objective" and "valid" knowledge can be produced, separating the, "researcher and the researched" (Markey *et al* 2014:17). Glaser and Holton (2004) described the researcher as gathering data objectively, acting as an independent observer, suggesting an objectivist stance. Subjectivism underlines the role which the researcher plays in that it suggests that, "the reality of all objects relies entirely on an individual's subjective mindfulness of it" (Markey 2014:17). This seems to describe, to an extent, the approach of Strauss and Corbin (1990; 1998) where there is interaction between the data and the researcher. Constructivism describes generation of knowledge from the researcher's, "knowledge and reflection" (Markey *et al* 2014:17) and is the approach taken by Charmaz (2000) where the researcher's interpretation of the data is highlighted. These differences in approach, for me, highlight the challenge with respect to recognising the researcher's role within a grounded theory study. I will describe my philosophy and its influence on my choice of methodology in Section 3.4.

3.3.6.2 Phenomenology

Creswell (2013:76) stated that a phenomenological study describes the, "common meaning for several individuals of their lived experience of a concept or phenomenon." This approach attempts to, "grasp the very nature of the thing" (van Manen 1990:177). The phenomenon in this instance would be optimising medicines use in acute hospitals and the proposed methodology would be to carry out one-to-one interviews and use focus groups to gather a description of the essence of the phenomenon,- describing the what and the how of participants' experiences. Phenomenology deals with the role of the researcher through a, "suspension of all judgements of what is real" (Creswell 2013), known as "epoch" from Husserl's writings (Creswell 2013:77).

Therefore, in phenomenology, the researcher needs to separate their own personal views and beliefs, known as bracketing, while conducting the study. Data analysis follows a systematic approach moving from individual statements to higher-level units of meaning (Moustakas 1994) and then more comprehensive descriptions which summarise participants' experiences. Coding is not used. The outcome from a phenomenological study will be a description of the essence of the phenomenon whereas a grounded theory approach will go a stage further in generating a theory.

A phenomenological approach was chosen initially as the researcher was more familiar with the methodology and the processes used to reduce the impact of the researcher who has responsibility for managing medicines in one Trust in Northern Ireland. However, through further reading and comparison of the two approaches, I decided to use grounded theory for a number of reasons.

Firstly it holds greater academic currency in comparison to phenomenology and that is important when considering dissemination of results. Generation of a theory which can influence future practice and policy, I believe, will have greater benefits to future work. The impact of the researcher can be controlled or recognised through either approach and the rigor of the coding methodology used in grounded theory supports its use.

Researchers use a theoretical framework to have a structure for looking at a problem. It helps with exploring, "relationships between variables to interpret and explain the data" (Vivar *et al* 2007: 65). By using a grounded theory approach, I am using a methodology which produces its own theory from the data collected and analysed and therefore adopting a theoretical framework is not appropriate (Strauss and Corbin 1998).

In summary, grounded theory is best able to meet the aim of the study. In the next section I will discuss the range of approaches described in the literature on developing grounded theory and the reasons for choosing the particular approach which I have taken in this study.

3.4 Choosing a grounded theory approach

There is a range of literature guiding researchers new to grounded theory in their choice of grounded theory approach (Glaser and Strauss 1967, Strauss and Corbin 1998, Locke 2001, Holloway 2005: Bryant and Charmaz 2007; Oktay 2012: Creswell 2013; Urquart 2013; Achora and Matua 2016). Writers have differing views of the philosophical paradigms which grounded theory lies within. Grounded theory has been described as, “an alternative to all paradigms,” (Jones and Alony 2011:97) who continued to state that the research approach should fit the, “needs of the research” and not the philosophical approach of the researcher (2011: 98). This is in line with a Glasserian approach.

Birks and Mills stated that, from the outset, the researcher planning to use grounded theory must understand his own philosophical view of the world, “encompassing the questions and mechanisms for finding answers that inform that view” (2015:2).

The range of schools of grounded theory continued to develop with a second generation of grounded theorists such as Charmaz (2000) and Clarke (2005). However despite ontological and epistemological differences, each school continued to adopt the main attributes of grounded theory which are theory production, coding and categorising data, concurrent data collection and analysis, writing memos and theoretical sampling (Birks and Mills 2015, Corbin and Strauss 2015). The researcher should also incorporate constant comparison of data, achieving theoretical saturation before integrating and putting together a grounded theory, which has a core category (Glaser and Strauss 1967, Birks and Mills 2015, Achora and Matua 2016).

In deciding on an approach, I wanted to be able to follow a structured methodological process as I had not used grounded theory before. I also wanted to acknowledge my role as the researcher in the study, and any personal or professional preconceptions of the subject area, and further show that I am aware of the potential for bias and therefore adopt a reflexive approach. I believe my philosophical perspective is that of a subjective

relativist, falling between the extremes of Glaser and Charmaz. Therefore, I have chosen to use the approach described by Strauss and Corbin (1998).

The key elements of Strauss and Corbin's' approach (1998) are listed and compared to those of both Glaser and Charmaz in Table 1. Central to this approach are constant comparison, asking questions and, "sampling based on evolving theoretical concepts" (Strauss and Corbin 1998:46).

Table 1: The key differences between the various schools of grounded theory (from Achora and Matua 2016)

Key Concept	**Classical grounded theory (Glaserian)**	**Evolved grounded theory (Straussian) (1998)**	**Constructivist grounded theory (Charmazian)**
Philosophical root	Post-positivism	Post-positivism with symbolic interaction foundations	Constructivism
Use of Literature	Delayed	Preliminary review	Preliminary review
Coding stages	Substantive and theoretical.	Open, axial and selective.	Initial, focused and theoretical.
Role of researcher	Passive, exhibiting disciplined restraint.	Active.	Active.
Coding	Less prescriptive with inductive-deductive mix.	Rigid coding structure for analysis, emphasising deduction, verification and validation.	Less prescriptive.
Resultant theory	Emergent (discovery).	Conceptual description.	Construction.

In summary, I will use the grounded theory approach defined by Strauss and Corbin (1998). The specific methods used will be laid out in Section 3.5.

3.5 Methods

The descriptions of the methods of data collection and data analysis have been put together in this section because in grounded theory, data collection and analysis are carried out concurrently (Bryant and Charmaz 2007).

Different researchers have adapted the classical grounded theory approach to data collection and analysis. Bryant and Charmaz (2007) made it clear that the "full package" of a specific approach to grounded theory must be adopted as opposed to picking methodologies from a range of grounded theorists. This purist approach has not been adopted by all researchers using grounded theory and has led to some studies inappropriately claiming that they have used a grounded theory approach. I have tried to adopt a purist approach to the methodology described by Strauss and Corbin (1998).

3.5.1 Data collection

Data in qualitative studies fall under four main headings - interviews, observations, documents and audio-visual materials (Creswell 2013). Urquart (2013) commented that when generating grounded theory, any data in text format which can be coded can be used. The researcher in grounded theory studies has been described as being a detective seeking out clues, exploring how participants, "make sense of situations" (Morse 2007).

A range of new forms of data is described in the literature, especially those which involve the use of the internet. Whilst there are financial and time-saving benefits in carrying out, for example, on-line interviews and focus groups, there are also disadvantages. Nicholas *et al* (2010) compared using face-to-face to internet focus groups for children with chronic diseases. They listed advantages of using the internet such as providing a, "neutral ground"

for participants (2010:108) as well as longer access to the data which allowed member-checking over time as well as providing transparency of the interaction. This method however may reduce participation from certain socioeconomic groups with both researchers and participants needing to be able to be internet-literate.

In a grounded theory study, the most commonly used methods of collecting data are by interviewing or observing participants (Corbin and Strauss 2015). Documents and audio-visual material can be used to supplement data. It is important that a method is chosen, not because of its frequent use but because it is the most suitable method to collect data to answer the research question (King and Horrocks 2010). I will explore the first two methods in greater detail below.

3.5.1.1 Interviews

The interview can be seen as a conversation between the researcher and the participant (Holloway 2005). Wisker (2008) however commented that interviews are more complex than this, needing a level of organisation and design. She referred to, “a continuum of interviews” (2008:194), going on to describe three main types - unstructured, semi-structured and structured. Corbin and Strauss (2015), in this later text, gave more detail on methods of data collection in grounded theory studies. They stated that unstructured interviews resulted in, “the richest form of data for theory building” (2015:38). They allow participants to have more control within the interview and to speak about what is important to them at a length and depth which reflects their experiences. Interviewers can steer the subject back to the original focus if needed, but in doing so, they must also reflect on why the participant took a particular path and its relevance to the data.

In conducting semi-structured interviews, the interviewer has a pre-determined list of themes or questions which can be asked in any order (Wisker 2008, Corbin and Strauss 2015). These themes may come initially from the literature on the subject and may change iteratively between

interviews as the researcher wishes to explore areas which have emerged from previous interviews. This is a form of theoretical sampling, which is central to grounded theory methodology. Participants are invited to add other thoughts or comments that they wish. Semi-structured interviews provide assurance for the researcher that specific topics are covered but also allow sensitivity to the flow of the conversation.

Structured interviews involve the use of an interview guide and each participant is asked the same questions. Corbin and Strauss (2015) viewed structured interviews as not providing rich data which support the development of a grounded theory. Participants are not encouraged to give their own views and the researcher is unable to alter the questions based on earlier interviews.

Advantages of one-to-one interviews in general include their simplicity to organise and control; the ability to attribute ideas to a specific participant; explore ideas in depth and allow a flexible approach (Denscombe 2010). The validity of the data can also be checked at the time of the interview.

There are disadvantages of using interviews. These include the researcher's ability to access appropriate participants, data reflecting what the participants say as opposed to what they may do in practice and the influence of the skills and background of the interviewer. The experience and confidence of the interviewer is important (Taylor 2005). It can affect the quality of the data provided and interviewers should reflect on each interview, for example, asking themselves whether they asked leading or closed questions. Interviewers should also be sensitive to body language, silences and changes in tone.

3.5.1.2 Focus groups

Focus groups are used to collect data through the interaction and discussion between groups of participants. They allow participants to determine the direction of the discussion and can elicit richer data from their relatively

natural conversational style as opposed to answering individual interview questions (Kitzinger 1994). Focus groups can be used along with other methods of data collection, for example, following one-to-one interviews, where they may allow further development of ideas within a freer, interactive conversation. The researcher will develop questions to be given to the group and may decide to use other materials, such as cards and objects, to prompt group discussion. Care should be taken to ensure all participants have given informed consent. Ground rules should be set at the outset, dealing with confidentiality and approach and after the session, the interviewer may have to correct any inaccurate information provided by group members during the discussion.

3.5.1.3 Observation

Although more time-consuming than interviewing, observational fieldwork allows the researcher to be situated in a particular setting and view what is happening. Observations may show differences between what a participant has said during a previous interview and their lived reality and so this method also can be used alongside other methods of data collection. Creswell and Creswell (2018) described two key types of observation. Participant observation (also referred to by Strauss 1987) involves the researcher spending time in the setting, integrating and adopting the language of participants. In non-participant observation, the researcher can observe a particular episode or view from a distance. Researchers however must be able to seek clarification from participants afterwards to ensure they have understood what was happening in certain situations. Wallace (2005) suggested approaching this clarification by asking open questions such as, “how things might have been otherwise” (2005:73) to elicit fuller descriptions of what was happening. Wisker (2008) referred to using an observation structure and schedule to prevent being inundated with data, although she recommended starting out with general observations which may influence the approach taken. Corbin and Strauss (2015) did not advise using an observational guide if this method is used in grounded theory research as it

can restrict what the researcher sees and hears. Again, an iterative approach can be taken from one observation to the next, allowing ideas to be developed. Many authors have concluded that the researcher can see what they want to during observation, therefore reflexivity is important and indeed the researcher's notes on this may become part of the data collected (Woolgar 1988).

The observation itself has the potential to affect the activity being observed. This has been referred to as, "reactance" by Wallace (2005) who made reference to the literature on this including the 'Hawthorne Effect.' Researchers using this method must give thought to ethical issues such as whether to intervene or not when they have a concern, getting fully-informed consent in a naturalistic environment and keeping participants' contributions anonymous. More recent studies using this method (Rixon *et al* 2015) described recording observations. This may help with member checking, potentially reducing reliance on field notes, but again may impact on the setting.

3.5.1.4 Documents

Documents such as policies, historical information, diaries, drawings and photographs can also be used as data.

3.5.1.5 Choice of method

One-to-one, semi-structured interviews were chosen as the method of data collection in this study. Silverman (2010) questioned whether a method is chosen because it is commonly or easily used as opposed to being the most appropriate method following analysis of the literature. In this study, I need to gather data from doctors, nurses and pharmacists, on how they use medicines and also how they believe their professional colleagues use them. I did not choose to use focus groups for a number of reasons. Firstly, I was

interested in being able to explore each individual's views of medicines-use in depth and on balance this would be better explored through one-to-one interviews. There may have been benefits in having a multi-professional conversation about using medicines but the richness, honesty and open expression of views could have been restricted, depending on the relationship and power balances between group members. Observational studies have become more common in generating grounded theory (Lewis and Tully 2009, Rixon *et al* 2015, Wilson *et al* 2016). By using this method, the researcher can see what is happening as opposed to hearing participants' perceptions. However as a Trust Head of Pharmacy and Medicines Management, I had particular concerns about observing practice in a different hospital. Although I would be there as a researcher, I believed that it would be difficult to observe without participants (and other Trust Heads of Pharmacy) viewing me as an inspector of their practice. I anticipated having potential problems should I need to intervene when I had concerns about practice and the impact that would have on the data collected. Therefore I did not engage in observations.

In summary, one-to-one interviews were chosen as an appropriate method to use when exploring, "complex and subtle phenomena" in depth, when looking to involve key players and explore, "how systems operate" (Denscombe 2010:187). Interviews also served to provide "slices of data that are many and varied" (Urquart 2013:69). It will provide data to address the research question. One-to-one interviews will allow participants to provide detailed information of how they work with medicines and what they see as the role of other professionals with medicines. Using a semi-structured approach facilitates the researcher in asking specific questions, allowing theoretical sampling by altering questions following analysis of previous interviews. It also allows participants to contribute additional information, enhancing the quality and richness of the data. Interviewing face-to-face as opposed to by telephone or by Skype was chosen to provide the best chance of getting rich data, from non-verbal cues as well as establishing a level of rapport with the participant.

3.5.1.6 Questioning in semi-structured interviews

An interview guide was used to list a number of initial themes and questions during each interview (Holloway 2005). The purpose of such a guide was to use headings loosely identified from the initial literature search to inform the early interviews and serve as potential prompts (Corbin and Strauss 2015). The initial interview guide, with comments on how this iteratively changed during the research process is in Appendix 5.

This was updated throughout the research process, following analysis of previous interviews (Strauss and Corbin 1998). The guide also included prompts and general questions which could be used to help participants who could not think of what to say. It must be noted however that silence in interviews is important, adding to the data. I have had training as a coach and am comfortable with silences. The guide also included the introduction to the interview. This provided structure and transparency, covering the purpose of the interview, the role of the researcher, getting consent, confidentiality, duration and the opportunity to withdraw or not answer specific questions. It also included some finishing sentences.

I asked an initial, open question in each interview which was designed to let participants speak freely about how they worked with medicines, to help them to start thinking about the subject and give them confidence to speak about something that they did each day. This was, “I am interested in your personal experience of working with medicines in hospital. Tell me about how you work with medicines in hospital?” Open questions were asked subsequently using “how” and “why” to encourage participants to speak freely. I tried to avoid complex and leading questions (Taylor 2005) and noted when I did this when listening to interview recordings.

Piloting an approach is recognised as pragmatic when planning to collect data, but is rarely referenced in grounded theory literature. Nunes *et al* (2011) put forward the proposal that carrying out a pilot study will help the researcher to understand the context of the proposed study as well as testing their interviewing and analytical skills. As a novice to using this research, I

decided to pilot my interview for two reasons – to test the interview guide and also to practise and reflect on my interviewing skills. This gave me confidence for future interviews.

The study design and ethics approval included the potential to use focus groups or documental analysis as well but these were not undertaken.

3.5.1.7 Planning interviews

Planning the interview is important (Wisker 2008, Denscombe 2010). Researchers should link with the participant beforehand to give details of the interview and agree a convenient time and place. Participants contacted me by email to express their interest in participating in the study. I replied, attaching an information sheet for interview participants (Appendix 9) and the participant consent form (Appendix 10). These are discussed in greater detail in Section 3.7. Interviews were planned to take place at least two weeks later to allow participants time to read the short paperwork and to withdraw if they wished.

I travelled to the hospitals that the participants worked in, having given them the choice to arrange an interview room which was private and protected or allow me to do this (Denscombe 2010). In general, rooms were booked away from clinical areas but a small number of interviews took place in offices on wards. This was not ideal as it could be argued that participants may not be fully focused on the interview. My experience was that this was not the case. Seating was arranged (usually at a 90 degree angle) to facilitate effective communication (Denscombe 2010). Participants were told that the interview would take 30 minutes and this timescale was adhered to. It is important to ensure a formal approach is adopted and the participant's time is respected.

An audio recording, with associated field notes provides an objective and accurate record of the interview (Denscombe 2010). Video –recordings can be invasive, and whilst they will show non-verbal cues, an audio recording with field notes is usually chosen as being appropriate for research purposes.

I sought the participant's permission to record interviews on two devices and described how I would store the data securely.

Recordings of interviews were transcribed verbatim by a secretary. This is important to preserve the accuracy of the interaction and can be viewed as the first stage of data analysis (Kvale 2008). I read through each transcript whilst listening back to the recording of the interview and corrected typographical errors, misunderstandings and also I made notes on things such as inflections and laughter which could add to the quality of the data. I re-listened to the recordings of previous interviews whilst I travelled to subsequent interviews, as well as updating the interview plan with new questions, to ensure I was steeped in the data.

There are a number of papers and texts which list the advantages and disadvantages of the role of the practitioner as researcher, researching either in one's own organization or field of practice. McNair *et al* (2008) stated that it is important for such individuals to recognise the many roles which they bring to the interview, for example a possible insider role with respect to the participants. McNair *et al* recommended explaining this to participants at the outset to provide clarity. I explained that I was a registered pharmacist at the outset of each interview and whilst a researcher, I also had a professional obligation to highlight any concerns raised in an interview with the relevant Trust professional lead. This would be done, however, following a conversation with the participant.

McNair *et al* (2008) listed a number of benefits of having a clinician researcher. These included being able to use relevant research questions, bringing extra knowledge to the analysis and having a dedication to and shared understanding of the subject. He highlighted potential downfalls in the approach as well. Role boundaries between the researcher and participant may become blurred with the researcher potentially not recognising their "shared conceptual blindness" with participants. This could affect the rigor of the work. There is also a concern that participants may feel coerced.

3.5.1.8 Sampling in grounded theory interviews

The sample of participants used in a qualitative research study does not need to represent the population which is being studied, as in quantitative research (King and Horrocks 2010). Creswell (2013) highlighted that in grounded theory studies, participants are chosen who have experience of and can contribute to theory development.

Strauss and Corbin described sampling in grounded theory as, “evolving during the process” (1998:202) as opposed to being planned from the start. The researcher is sampling what is happening as opposed to sampling individual practitioners. This is known as theoretical sampling. Creswell (2013) explained that theoretical sampling begins with choosing and studying a homogeneous sample of participants who contribute to the initial development of the theory. Then, a heterogeneous sample can be chosen to, “confirm or disconfirm the conditions under which the model holds” (2013:155).

Morse highlighted that a, “targeted research question may guide selection [of participants]” (2007:236). My research question led me to sample from individuals who were doctors, nurses and pharmacists working in acute hospitals in Northern Ireland.

I had concerns about whether to choose an initial homogeneous sample of participants from one profession or whether to choose an experienced practitioner from each profession to provide a breadth of initial data. Morse (2007) commented that the context of the research is important when making decisions about sampling. She referenced carrying out an, “armchair walk-through” as described by Richards and Morse (2007:236) to help plan a sample. I carried out an armchair walk-through at the outset (Appendix 6) and decided the following:

> *I think I will start by having one-to-one interviews with a member of each of the three professions with at least one year’s acute hospital ward experience (so that their views are based on experience as opposed to being solely theoretical).*

As the theory building developed, through using open, axial and selective coding, my sampling focused on specific concepts and became more purposeful. In open coding, participants are chosen openly as they present themselves, as concepts and categories of the theory have not been developed as yet. During axial coding, the researcher is looking for relationships between categories and sub-categories. They also are looking at variation in the data in terms of properties and dimensions. They may look for participants who they believe will allow them to test these. This may be a challenge for a number of reasons. The researcher may not have access to sufficient participants to allow them to choose. Also Strauss and Corbin (1998:210) stated that purposeful sampling, as recommended at this stage, is, “a deductive process.” The researcher may believe that a particular participant will provide further data on a specific category but this may not be the case. Finally, in selective coding, more specific sampling should be used to help fill gaps, integrate categories and validate previous comments. The researcher should engage participants who will help to continue with constant comparison and validation of concepts which may contribute to the final theory.

Initially, I interviewed two pharmacists, a specialist nurse and a doctor who worked both in an acute hospital and as a general practitioner (GP). They were all experienced practitioners (Table 2) and provided, “an overview of the entire process” of medicines optimisation in an acute hospital (Morse 2007:237). As well as meeting my armchair criteria, they were also the first four individuals who volunteered to participate in my study. They worked in two different acute hospitals. I was concerned that the doctor had a combined role, working in a hospital and as a GP. On discussing this with my supervisors, I decided to include this individual who had a wealth of acute hospital experience and also worked closely with the nurse. I was interested in exploring how these individuals worked together, as team-working was emerging as an early category. Two of these experienced practitioners (a nurse and a pharmacist) compared their way of using medicines to that of medical staff. I wanted to see if there was variation in these views and if they were influenced by the professional group. I interviewed two doctors next. I

modified my questions as coding progressed, to allow me to test categories with each participant.

Saturation is described in detail later in Section 3.5.2.4. I could see no new concepts at interview 13 but I continued interviewing for a number of reasons. Firstly, I was conscious that I had interviewed only three nurses and I wanted to explore some emerging concepts with at least one more; I felt my first interview with an FY1 doctor (interview 12) did not go as well as I had hoped and I wanted to interview at least one more FY1 doctor; finally I wanted to be sure that no new concepts would emerge. Subsequently I interviewed two more FY1 doctors and a new ward manager.

The main approach to theoretical sampling in this study was my use of new questions. Through coding, analysis and the use of theoretical memos, I formulated new questions on areas which I wished to explore in subsequent interviews. These tested out what I believed were emerging categories. Therefore I modified the interview guide as I progressed through the study. Examples of these new additional questions have been added to the end of Appendix 5.

3.5.1.9 Study participants

Seventeen individuals (seven doctors, four nurses and six pharmacists) were interviewed. Table 2 gives further details of the participants, listed in the order that they were interviewed. One of these interviews was a pilot interview and I will discuss the reasons for this below and in a memo in Appendix 7.

Participants were based in four of the six Health and Social Care (HSC) Trusts in Northern Ireland. These were the:

- Belfast Health and Social Care Trust.

- Northern Health and Social Care Trust.
- Southern Health and Social Care Trust.
- South Eastern Health and Social Care Trust.

I interviewed participants in two hospitals in one Trust (the Belfast Health and Social Care Trust); therefore five hospitals are mentioned in Table 2.

Table 2: List and details of participants in the study

Participant number	**Role description in the thesis**	**Grade and length of experience**	**Name used in the thesis**	**Hospital by code**	**Number of references in the thesis 31.12.18**
Pilot	Pharmacist 0	Band 8a 20 years	Polly	1	6
1	Pharmacist 1	Band 7 5 years	Rebecca	1	12
2	Doctor 1	GPSI 29 years	Joan	2	8
3	Pharmacist 2	Band 8a 26 years	Karen	2	15
4	Nurse 1	Band 5 14 years	Patricia	2	12
5	Doctor 2	CT 4 4 years	Jayne	3	19
6	Doctor 3	Registrar 11 years	Sally	4	23
7	Pharmacist 3	Band 8a 10 years	Angela	3	18
8	Nurse 2	Band 6 3.5 years	Shirley	4	18
9	Pharmacist 4	Band 8c 34 years	Deirdre	2	15
10	Pharmacist 5	Band 7 5 years	Caroline	4	15
11	Nurse 3	Band 5 3.5 years	Jackie	4	13
12	Doctor 4	FY1 4 months	Fred	1	3
13	Doctor 5	FY1 5 months	Mary	5	15
14	Doctor 6	Specialty Doctor 10 years	Frank	1	9
15	Doctor 7	FY1 6 months	Jack	1	10
16	Nurse 4	Band 6 10 years	Cathy	1	9

Interviews were not carried out in the Western Health and Social Care (HSC) Trust or the Northern Ireland Ambulance Trust. The Research and Development office in the Western HSC Trust had given approval for the study to be carried out there but participants from there were excluded as the researcher is the Head of Pharmacy and Medicines Management in the Western HSC Trust. This will be explored later in the ethics section (Section 3.7).

Non-statistical sampling methods are used when developing a grounded theory (Creswell 2013). Although not looking for equal representativeness of professions and Trust sites, I did try to interview similar numbers of doctors, nurses and pharmacists from each of the four Trusts. I found it particularly challenging to find nurses who would be willing to participate. I tried to use a "snowballing" approach (Cresswell 2013) to getting more nurses by asking participants to suggest others who may be able to contribute to the research. This was successful in getting one further nurse involved. However individuals from two different clinical teams volunteered and so I believe there was an element of informal snowballing happening in these areas. I planned to find self-selecting participants at each site by asking permission to hang posters in staff areas in acute hospitals, inviting participation. I sent coloured posters (Appendix 8) to the Head of Pharmacy and Medicines Management of each Trust who were gatekeepers for the study (and named as local investigators) in each Trust. I received emails initially from pharmacists who I had worked with in the past and who were keen to be involved. I had to politely decline these offers to reduce my impact on the data. The process of getting participants was slow and I added prompts into the system by asking the Medical Director and Director of Nursing from my Trust to forward information and posters to their professional colleagues in the other four Trusts and follow the contact up at regional meetings. I also had to contact the four Trust Heads of Pharmacy and Medicines Management again towards the end of the study to get the last few participants.

I was concerned that some participants would not fully understand the specific term, ‘”medicines optimisation”’ but would view “optimising medicines”’ solely within the Oxford English Dictionary’s definition of “to optimise” which is, “to make the best or most effective use of [a situation or resource]” (2018). I checked participants’ understanding of the term at the end of later interviews and all but one participant was able to describe its general meaning. However despite this, all participants mentioned most elements included in the NICE definition.

3.5.1.10 Research journal

Corbin and Strauss (2015) discussed keeping a research journal to aid self-reflection throughout the research process. I kept a research journal, as a separate document to memos, in which I wrote my reflections on how my research was progressing. This provided a timeline for the research and contributed to the transparency and reflexivity of the work. I described how I felt at different stages, writing through my own thoughts to help me to determine whether I was making assumptions. This helped me to be more aware of my own thoughts and feelings towards the research and helped me to progress. A research journal can be used as data.

3.5.2 Data analysis

The data from interviews was coded as described by Strauss and Corbin (1998). Coding and analysing data from the outset coupled with checking new ideas with those already captured (making constant comparisons) defines the grounded theory approach and sets it away from the ethnographic approach of gathering a large amount of data and letting it speak for itself (Creswell 2013). I have given more detail on how I analysed the data, along with examples from the data in Chapter 4. I will outline briefly the coding methods which I used in this section to signpost the approach.

3.5.2.1 Coding methods

Strauss and Corbin (1998) defined three stages of coding. These are:

- Open coding – breaking the data apart to identify the building blocks of theory.
- Axial coding – linking categories.
- Selective coding – “building a story” to connect the categories, forming theory.

3.5.2.1.1 Open coding

In grounded theory, the theory is grounded in the data but the skills of the researcher are required. To this end it is important to begin by breaking the data down into discrete pieces before building it up again. This is known as open coding.

Open coding was carried out line-by-line, using gerunds and some in-vivo codes as appropriate. I used constant comparison along with writing conceptual memos. The actual process followed is described in detail in Section 4.2.

3.5.2.1.2 Axial coding

Strauss and Corbin defined the purpose of axial coding as,” to begin the process of reassembling data which were fractured during open coding” (1998:124). The goal is to, “systematically develop and relate categories” (1998:142). The use of specific analytical tools ensures rigor in the research

(Chiovitti and Piran 2003) and also guides the novice researcher. This is central to the Strauss and Corbin model of grounded theory and allows the researcher to build a dense and rich theory from the data. Strauss and Corbin (1998) gave a number of examples of analytical tools and techniques which can be used by the researcher. They commented, “we emphasize strongly that techniques and procedures, however necessary, are only a means to an end. They are not meant to be used rigidly in a step-by-step fashion. Rather their intent is to provide researchers with a set of tools that enable them to approach analysis with confidence and to enhance their creativity that is innate” (1998:14). I have used most of the tools described in this text, hopefully, “flexibly and creatively” as opposed to, “in a rote manner” as aspired to in Strauss and Corbin (1998:8) and have described these below.

- **Asking questions of the data**

The researcher can analyse the data in greater depth by asking the questions, who, when, where, why, how and with what consequences? These questions are asked throughout data analysis.

- **Using the Paradigm Model as part of axial coding**

Strauss and Corbin described the Paradigm Model as a scheme used to, “sort out and organise the emerging connections [between categories]” (1998:128). By using this model, the researcher can analyse and order the data, helping to integrate it further into emerging theory and also to help describe the final theory. Table 3 outlines the structure of the Model.

Table 3: Structure of the Paradigm Model derived from Strauss and Corbin (1998:128)

Conditions (causal, intervening or contextual)	The set of circumstances in which the phenomena are embedded. *A conceptual way of grouping the answers to why, where, how come and when?*
Strategies (actions and interactions)	Strategic or routine responses to events that arise under these conditions. *Grouping answers to, by whom and how?*
Consequences	The outcomes of actions and interactions. *What happens as a result of the actions/interactions (or not)?*

- **Developing the category in terms of its properties and dimensions**

Strauss and Corbin described properties as, "the general or specific characteristics or attributes of a category" with dimensions representing, "the location of each property along a continuum" (1998:117). This is another analytic approach which allows the researcher to systematically link properties along the range of dimensions.

- **Coding for process**

Strauss and Corbin (1998) described coding for process as, “purposefully looking at action/interaction and noting movement, sequence, and change as well as how it evolves (changes or remains the same) in response to changes in context or conditions” (1998:167).

The outputs of these methods were not used as data but the methods were used, “as tools to help get a better understanding of the data” (1998:85). They provided a framework within which to operate which helped to reduce researcher-bias in the analysis. I have demonstrated how I used each of these tools in Chapter 4.

Strauss and Corbin (1998) introduced an additional way of coding called a conditional matrix. Subsequent texts have made reference to this (Corbin and Strauss 2008, 2015) however other researchers have outlined the difficulties with its use in terms of having, “the data, time, or resources” (Creswell 2013:87). I did not use the matrix also for the aforementioned reasons.

In summary, I used a range of analytical tools, including asking questions of the data, using the Paradigm Model, developing categories in terms of their properties and dimensions and coding for process. I did not use the conditional matrix for the reasons outlined above.

3.5.2.1.3 Selective coding

Strauss and Corbin defined selective coding as, “the process of integrating and refining the theory” (1998:161). Again they defined analytical methods such as writing more in-depth theoretical memos, writing the storyline and drawing further diagrams, including a final integrative diagram in which links are shown between the major concepts in the theory. This integration, using selective coding, takes place over time and involves, “organising categories around a central explanatory concept” (1998:161). This is known as the core category.

Strauss and Corbin (1998) outlined the importance of the core category as coming from the data and giving, in essence, a short description of what the research is all about. It is able to link and pull together the other categories, providing an explanation of the theory, having analytical power. They outlined six criteria for choosing a central category. These are listed in Table 4.

Table 4: Criteria for choosing a central category (Strauss 1987 in Strauss and Corbin 1998:147)

1. It must be central; that is, all other major categories can be related to it.
2. It must appear frequently in the data. This means that within all or almost all cases, there are indicators pointing to that concept.
3. The explanation that evolves by relating the categories is logical and consistent. There is no forcing of the data.
4. The name or phrase used to describe the central category should be sufficiently abstract that it can be used to do research in other substantive areas, leading to the development of a more general theory.
5. As the concept is refined analytically through integration with other concepts, the theory grows in depth and explanatory power.
6. The concept is able to explain variation as well as the main point made by the data; that is, when conditions vary, the explanation stills holds, although the way in which a phenomenon is expressed might look somewhat different. One also should be able to explain contradictory or alternative cases in terms of that central idea.

I will demonstrate how I used each of the abovementioned analytical methods, including detail on how the core category and theory emerged in Section 4.4.

3.5.2.2 Constant comparisons

Corbin and Strauss stated that, “making constant comparisons refers to the act of taking one piece of datum and examining it against another piece of datum both within and between documents” (2015:93). By doing this the researcher can find out how concepts differ or are similar. Making constant comparisons is a core element of developing grounded theory. It is embedded into how the researcher analyses the data within and between each interview before embarking on a subsequent interview.

In moving from open coding, through axial to selective coding, three types of comparison are used (Strauss and Corbin (1998). These are:

- Comparison of different incidents to see if there is uniformity in the concepts generated.
- Comparison of concepts with new incidents to get a richer data and move towards data saturation.
- Comparison of, “emergent concepts” to get, “best fit between potential concepts and a set of indicators”.

I used this throughout the research process and will give examples of this in Chapter 4.

3.5.2.3 Writing memos

Writing memos also is an essential part of grounded theory methodology and has been written about extensively (Strauss and Corbin 1998; Birks and Mills 2015; Urquart 2013, Charmaz 2014). Strauss and Corbin described memos as, “written records of analysis that may vary in type and form” (1998:217). Birks and Mills described writing memos as,” the critical lubricant of a grounded theory machine” (2015:40). They highlighted a variety of purposes for writing memos, including describing your thinking as you gather and analyse data, helping to, “raise your data to a conceptual level” (2015:41)

and providing an audit trail of how grounded theory was generated, enhancing the quality of the research. Each researcher will develop their own style of writing memos. I regularly wrote memos as I carried out initial open coding relating each memo to a section of an interview using the interview number, page and paragraph (#3:p14-01). In these, I highlighted in red specific questions which I wanted to pursue in the following interview and added these to the interview plan. My memos changed as I progressed through the different stages of coding. I described when my thinking changed making sure this was grounded in the data. I explored the development of higher-level categories and theory and also concerns which I may have had, for example, writing through concerns about rigor and how to ensure this. At times, I updated memos as my analysis of the data continued and also included quotations from the data to provide easier focus and reference when returning to a specific memo. My memos helped me in understanding how I had developed specific thinking and provided me with a confidence in the process as well as an historical time-line of how the theory had developed. I also drew diagrams as part of the process of linking concepts or making them clearer (Strauss and Corbin 1998). I have made reference to specific examples of my use of memos in Chapter 4.

3.5.2.4 Reaching saturation

Strauss and Corbin spoke of saturation as being when a point is reached where additional data collection seems, “counterproductive; the ‘new’ that is uncovered does not add that much more to the explanation at this time” (1998:136). They add that it may also be the point when the researcher has no time or money remaining. The concept of saturation was used by earlier authors as a more conclusive point, but Strauss and Corbin commented that a researcher can never state that nothing new, however small, can emerge from the data. I am using the term in line with the Strauss and Corbin (1998).

Mason (2010) spoke of the potential of producing better analysis from a smaller number of well-constructed interviews. Therefore it may be the quality as opposed to the quantity of data that is important. All of this has an impact on the strength, credibility and generalisability of the study.

Charmaz (2014) raised the level of discussion of the concept of saturation, highlighting that it may be achieved at an earlier stage if repetitive and less innovative approaches are used in collecting data. Using “iterative” data collection, analysis and theoretical sampling will result in the emergence of, “no new properties of the pattern” as opposed to, “seeing the pattern over and over again” (Glaser 2001:191). This leads to a rich grounded theory with “conceptual density.” Charmaz (2006) expressed concerns that high-level analysis may result from working too closely to the grounded theory definition of saturation. She encouraged researchers to keep going back to the data, recoding it and remaining open to new possibilities to achieve richer theory.

The implications of this wide debate appear to be that the grounded theorist should not depend on a relative concept of saturation when considering when to stop collecting data. Rather, they should focus on the quality of the theory being produced, through use of effective interview techniques, analysis and theoretical sampling. This will produce a thick description of what is happening here.

3.6 Enhancing the quality of the data

There is a breadth of literature on how to evaluate the quality of a qualitative study, with Corbin and Strauss believing that, “the problem of how to assess qualitative research has not yet been resolved” (2015:341). The authors commented that quality should be designed into a grounded theory study from the outset as opposed to trying to measure it subsequently.

Whilst terms such as validity and reliability are used to assess quantitative studies, other terms such as credibility, dependability, rigor, transferability and confirmability also have been referred to in the literature on assessing

qualitative work (Glaser and Strauss 1967; Holloway 2005; Creswell 2013). Criteria have been produced to evaluate the practical elements of a qualitative study (Strauss and Corbin 1990; Chiovitti and Piran 2003; Morse 2007; Creswell 2013), although their inability to also capture the artistic and more creative characteristics of qualitative studies have been commented on by Charmaz (2006) and Corbin and Strauss (2015). I have used the framework devised by Spencer *et al* (2003) to evaluate this research study and a completed framework has been included in Appendix 18.Holloway stated that the most frequently used measures of the quality of qualitative studies are, “trustworthiness” and “authenticity” (2005:276). These are also referred to by Glaser and Strauss (1967), Lincoln and Guba (1985) and Morrow (2005).

Qualitative research must be trustworthy and valid, in other words it must be truthful and relevant (Freshwater *et at* 2010). In order to achieve this, the researcher must demonstrate reflexivity, being able to reflect on their role within the research, their relationship with the participants and the methods which they used to maintain reflexivity throughout the research process (Ballinger 2004). Birks and Mills stated, “it is only through the analysis of your subjectivity through the judicious process of reflexivity that you can guide your own actions in a more insightful way” (2015:55). I used a number of methods including, being open about my background and interests in a reflexive statement (Appendix 1); using a defined and structured methodology (Strauss and Corbin 1998) to help to reduce subjectivity; recording interviews, transcribing them verbatim and using memos. I also wrote comments and concerns in a researcher diary. In this, I regularly reflected on my thinking and whether I needed to take a step back, how I carried out interviews, the questions I used, whether I influenced participants; and sharing and discussing recordings and coded transcripts with my research supervisors.

Two types of validity are referred to in the literature (Creswell and Creswell 2018). Internal validity can be demonstrated by using “thick descriptions” of the data to show what is happening and allow others to believe they were there (Glaser and Strauss 1967). Member checking can be used to ask

participants to check that the researcher's interpretation is valid. The researcher must also give a clear description of data collection and analysis to help others to determine how the theory was derived, that would allow another researcher to carry out the study (also referred to as transparency). External validity refers to the generalisability of a study. Corbin and Strauss stated that, "generalisability is not the purpose of qualitative research" (2015:377), which does not use representative samples. However there should be learning from the study and the grounded theory which could be used in other areas.

The grounded theory must be credible or believable, making sense to professionals who work in the field as well as to the layperson. I have presented my study to three professional groups (Directors of Pharmacy in Scotland, the Medicines Optimisation Research Group at the University of Bradford and pharmacists from across Ireland who had just completed a clinical leadership course). I also discussed it with two senior clinicians within my Trust, a senior pharmacist in Scotland and also I asked a pharmacist with knowledge of medicines-related risk to read the thesis and make comments. They all stated that they understood the theory and that it made sense. A number were surprised at certain findings such as inter-professional dependencies and this generated further discussion. I am conscious that some of these individuals may have supported my findings blindly but I believe that the level and interest in subsequent discussion did not reflect this.

Glaser and Strauss (1967) also spoke of the "applicability" of a theory to other areas, with it also being able to support change in wider systems.

Corbin and Strauss commented on the number of studies which use a grounded theory approach, not building specific theory or following a "consistent method" (2015:347). A grounded theory study should always use constant comparison, develop codes, categories and concepts, define a theory with a core category (in diagrammatic form) and use theoretical sampling, and possibly saturation. My study has incorporated each of these elements. They stated that the researcher must be reflexive, creative, be

clear about their aim, develop a sense of and respect for the subject and the participants and design quality into the study from the outset.

3.7 Ethical issues

King and Horrocks (2010) highlighted the importance of being aware of the consequences of producing knowledge through qualitative research. The research should be ethically justified. They described the ethical principles of respect for persons, beneficence (ensuring participants' well-being) and fairness.

Willig (2001) listed five basic ethical considerations for qualitative research:

- Informed consent from participants before the research is started.
- Not deceiving participants.
- Ensuring participants feel free to no longer be involved without fear of repercussions.
- Allowing participants to have access to the published outcomes of the study.
- Confidentiality.

Participants were given an information sheet on the study two weeks before they were interviewed. This allowed them to give informed or "knowing" consent to being involved as described in King and Horrocks (2010). A copy of the information sheet for interview participants in this study is in Appendix 9 and covers the five points above. King and Horrocks highlighted informed consent in qualitative interviewing as being a process, that requires continuing renegotiation and allowing participants the opportunity to withdraw at any stage. At the start of each interview, participants were asked to read through the information sheet again and to initial each point on a participant consent form. The form was then signed by the participant and the interviewer. A copy of the participant consent form is in Appendix 10.

Respect for participants is central to the qualitative researcher's work with participants being assured of anonymity and privacy, and research records

kept confidential. Interviews were numbered and participants were given pseudonyms with codes kept separately and securely. I discussed the use of specific quotes with participants and I have paid attention in laying out the data to ensuring it is used in a way which does not inadvertently identify a participant. Appropriate consideration has been given to the length of time that records of interviews are held, with due reference to the Data Protection Act 1998, ensuring personal data is kept for no longer than necessary. I sought approval to hold data until December 2019 in the research ethics submission to each Trust. This was to allow sufficient time to submit this thesis and subsequent papers for publication.

I planned to offer participants the opportunity to read through interview transcripts to validate what they had said. This was to serve two purposes; for member checking and also recognising the democratic principle (King and Horrocks 2010) that this information belongs to the participant. However, as transcripts were verbatim records of the interview, on reflection I decided that this would serve no purpose. Participants were told before each interview that they could contact me at any time to withdraw any statements which they had made. I have a professional obligation to highlight any risks to patient safety highlighted through this research and I explained this to participants. The outline of these explanations can be accessed in the interview guide in Appendix 5.

This study did not require review by a Research Ethics Committee (REC) within the UK Health Departments Research Ethics Service as research was limited to involvement of staff as participants (no involvement of patients or service users as participants). An on-line Study-Wide document set (IRAS Ref: 182436) was submitted for review by the University of Bradford's internal IRAS reviewer. The study received ethics approval to proceed to the NHS for consideration and ethical review. Copies of the approval email and sponsorship letter are in Appendices 11 and 12. The IRAS application was submitted for Health and Social Care (HSC) Research Governance permission via the Northern Ireland HSC Research Gateway. NHS/HSC Research and Development (R and D) approval was given by each Trust. Copies of letters confirming Health and Social Care (HSC) Trust final

research governance approval from Belfast, Northern, South Eastern and Southern HSC Trusts are in Appendix 13. As this was a multi-centre study, HSC Site Specific Information forms were electronically transferred to the Principal Investigators on each of the five potential Trust study sites. The Principal Investigators were either the Head of Pharmacy and Medicines Management or the Research Pharmacist in that Trust. Local Trust Research and Development Research Placement Agreements subsequently were put in place.

Kairuz *et al* (2007) described the importance of the researcher having high ethical standards. I worked in line with the Pharmaceutical Society of Northern Ireland's Code; Professional standards of conduct, ethics and performance for pharmacists in Northern Ireland (2016) and the Department of Health, Social Services and Personal Safety Northern Ireland's (DHSSPSNI) Research Ethics Framework (2005) and the subsequent UK Policy Framework for Health and Social Care Research (NHS Health Research Authority 2017).

3.8 Summary

In Chapter 3, I have discussed different research methodologies, giving my reasons for choosing a qualitative, grounded theory methodology. Concurrent data collection and analysis methods were highlighted. The importance of ensuring quality and rigor in a qualitative study was explored. The ethical issues which were taken into account when designing the study were detailed.

4.0 Data Analysis

4.1 Introduction

In Chapter 3, I stated that the aim of this study was to produce a theory which explains how doctors, nurses and pharmacists work to optimise the use of medicines in acute hospitals in Northern Ireland. I described the methods which I have used to collect, analyse and integrate data, using grounded theory methodology.

Grounded theory, as defined by Strauss and Corbin, is, “theory that was derived from the data, systematically gathered and analysed through the research process” (1998:12). Central to using grounded theory methodology is the simultaneous generation and analysis of data (Birks and Mills 2015) using the constant comparison method, theoretical sampling and memos as outlined in the previous chapter. Analysis and integration of the data starts from the outset and develops throughout the data collection process.

In their later work, Corbin and Strauss, when describing data analysis, highlighted the artistic and scientific nature of the work, with the researcher being able to, “spin straw into gold” (2008:49). For me, this very creative metaphor reflects the rhythmic and continuous working with the often disjointed and individual strands of data, letting them run through your fingers, intertwining them and through the “spinning” process, creating something which is of greater value - the theory.

In this chapter, I will detail how I used the methodology, giving examples of data analysis, constant comparison and using memos throughout which explained how the data were integrated into the final theory. The outcome of this process is an integrative diagram giving an overview of the core category and the theory (Figure 5).

I analysed the data in a structured way as described by Strauss and Corbin (1998). I have divided up my data analysis to show structure and process in my methodology and to help provide an audit trail, demonstrating rigor.

However, as highlighted by Strauss and Corbin (1998), open and axial coding happened concurrently, helping to build up a dense and rich theory from the data. The structured approach to laying out the data is a necessary one, demonstrating transparency, and I will try to link the categories and sub-categories together in my outline as opposed to listing them in isolation.

4.2 Open coding

I coded each line of each interview by hand, writing each code in the margins of the interview transcript, using active terms (gerunds). Examples of these initial line-by-line codes for three different interviews (a doctor, a pharmacist and a nurse) can be seen in Appendix 14. At the beginning, I found it difficult to find different language which captured the essence of what was being described. This became easier as I immersed myself in the data. I grouped the line-by-line codes initially by hand-writing them under emerging headings (concepts) in an artist's pad, making sure to reference their source using the interview number and the page number, for example (#1p4). As interviews and coding progressed, it became apparent that certain open codes, for example, checking and amending discharge letters, were profession-specific, whilst others, related to the work of all three professional groups, for example, checking with patients. At this stage it was important to capture this detail to provide a clear audit trail and aid future analysis. This developed to writing codes on coloured Post-it notes and small cards which I could move around into different emerging categories as the analysis progressed. The Post-it notes were colour-coded with a profession-specific colour, to make it clear which profession the code related to.

At the same time, I wrote memos on what I believed was happening in the data, asking questions of the data and identifying new questions to ask new participants at a later stage. There are some examples of these in Tables 9 and 10. I also maintained a researcher journal of my thinking and learning throughout the process, improving reflexivity.

Starting from the first interview, I grouped together line-by-line codes which had similar meanings and gave them an overarching name which encompassed what they had in common. Strauss and Corbin (1998) refer to this as conceptualising. Table 5 is an example of grouping initial line-by-line codes from early interviews to form the concept, *having checking systems*.

Table 5: Examples of initial line-by-line codes which fed into the concept, having checking systems

Initial line-by-line codes	**Concept / category**
Checking with patients. Checking with pharmacists. Seeking expert advice. [Pharmacists] checking and amending discharge letters. Telling the patient's medicines story. "Trying to actively engage my brain every day." Monitoring patients. [Pharmacist] is "keeping us right." Focusing on getting it right. Checking out concerns. Nurse's role- checking if unsure. Challenging prescribing. Managing missed doses. Involving patients in discharge. Adopting a structured approach. Empowering others to question prescribing. Having in-built checking alarms..	Having checking systems.

In this way, a list of concepts emerged from the data in the early interviews. This list is in Table 6.

Table 6: A list of initial concepts which emerged from the first four interviews

- Professional responsibility.
- Responding to queries.
- Ensuring accuracy.
- Prioritising.
- Ensuring timely administration of medicines.
- Not in control of own work.
- Problem-solving.
- Having checking systems.
- Managing workflow and time.
- Risk management – minimising risk.
- Prescribing habits of doctors.
- Multi-professional working/ multidisciplinary team working.
- Prescribing pharmacists and nurses.
- Communicating openly.
- Following standards of practice.
- Structured working.
- Building open relationships between healthcare professionals.
- Training - learning on the job.
- Increasing complexity of medicines.
- Correcting prescriptions.
- Having a discharge focus.
- Pharmacists' roles on admission.
- Struggling with complexity.
- At the forefront of practice/power.
- Having governance processes in place.
- Using guidelines.
- Involving patients – focusing on what the patient needs.
- Choosing drugs.
- Making efficient use of time.

Some of these codes and concepts reflected the work of members of just one or two of the professional groups. I noted this to aid further analysis.

I checked that the concepts did not simply reflect any questions which I asked during the interviews and saw that this was not the case. My questions were open, for example, “how do you work with medicines?” This can be seen in the outline of the interview guide which is in Appendix 5. I used these concepts to continue to group the line-by-line codes from subsequent interviews. This list of concepts grew longer as new concepts emerged from the data.

Strauss and Corbin (1998) described carrying out microanalysis by grouping codes or concepts under, “more abstract higher order concept(s), based on its (their) ability to explain what is going on” (1998:113). They described these categories as having, “analytic power because they have the potential to explain and predict” (1998:113).

4.2.1 Categories

Through the use of constant comparison and memos, a number of early categories emerged from the data. Some of these are listed in Table 7

Table 7: A list of some of the early categories which emerged from the data

- Making the best use of time.
- Working under pressure.
- Managing risk.
- Seeing the whole patient.
- Having checking systems.
- Reviewing medicines.
- Administering medicines.
- Seeing the whole process.
- Working in a complex world.
- Communicating with each other.
- Effective team working.
- Valuing multi-professional working.
- Developing new roles, for example, independent prescribing.
- Using the evidence base.
- Learning on the job.
- Understanding roles and responsibilities.

This is not an exhaustive list of all of the categories and further categories emerged from subsequent interviews and comparisons. Strauss and Corbin (1998) highlighted different ways of naming categories including using a name of an earlier concept which is broader than the others, using *in vivo* codes or using a concept from the literature. Initially I used mainly the first approach but as categories developed, I used all three and reference will be made to this later in the chapter. In general, I made sure that the names of the categories were embodied in and had their meanings in the data.

Within the context of the research question, I also tried to organise initial open codes under professional role headings, for example, what codes relate to the role of the doctor, nurse or pharmacist as well as to specific processes associated with these professionals, *i.e.* prescribing, administering and checking medicines. Although this helped me to become more familiar with the data, I believed it tended to force it and so I did not pursue it at that early stage. However this work was helpful later in the analysis when I used the

data to demonstrate a subsequent category of *understanding roles and responsibilities* which was later integrated into the core category *managing risk*.

I underlined *in vivo* codes as I coded each transcript. *In vivo* codes, as described by Glaser and Strauss (1967), are taken from the words of the participants themselves and are often more eye-catching terms. In this way, I was using the language of participants which captured what was happening, making the data more real. I have used a number of these *in vivo* codes in later chapters when laying out the theory.

4.3 Axial coding

In Chapter 3, I described axial coding using specific methods defined by Strauss and Corbin, “as tools to help get a better understanding of the data” (1998:85).

These included, asking questions of the data, using the Paradigm Model as outlined in Section 3.5.2.1.2, developing categories in terms of their properties and dimensions and coding for process. These methods provide a framework to operate within which helps to reduce researcher bias in the analysis. I will now describe how I used each of these. It should be noted that the outputs of these methods were not used as data but the approaches were tools.

4.3.1 Asking questions of the data

Asking questions such as, who, when, where, why, how and with what consequences helped me to understand what was happening and to examine the data more fully. Strauss and Corbin stated that by answering these questions, “analysts are able to relate structure with process…which helps to get at some of the complexity that is so much a part of life”

(1998:127). I have included an example of asking these questions of the category, w*orking together,* in Table 8.

Table 8: Asking questions of the data relating to *working together*

Question	**Answers from the data**	
Who?	Health care professionals at different grades. Health Professions, Hospitals.	
When?	All the time. Formally in outpatients/ward rounds. Informally- knowing there are others in the background, "having your back." When asking for advice. When reviewing patients.	When making decisions. When moving things forward, for example, planning a discharge. When others need help. When there is someone with more appropriate skills to do the job.
Where?	On the ward, at the bed side, on ward rounds, in out-patients.	
Why?	Getting all jobs done. Using skills in the best way. Getting things right. Reducing risk. Supporting on- the- job learning.	Developing knowledge and experience. Developing professional roles. Making interdependencies work.

		Filling the gaps.
How?	By being helpful. Passing on information – formally or informally. By answering queries. By keeping others up to date. Signposting doctors. Developing specialist /prescribing practice.	Putting pharmacists and technicians onto wards. Co—ordination roles, for example, at discharge, TDM. Knowing how others can help. Knowing what everybody does. Being part of the team. Doing my role.
With what consequences?	Staff feel supported – "having your back." Work gets done- the system keeps going. "Watching your back." All the jobs get done – grunt work, mundane. More efficient working. Greater job satisfaction.	Working closer to patients. Person with the right skills does the job. More holistic patient care. Reducing or increasing double-handling. Getting it right. Making the best use of time.

I also used the tool of asking questions from the data when I wanted to dig deeper into what was happening with respect to the prescribing roles of doctors, nurses and pharmacists. I had asked Karen (Pharmacist 2), a prescribing pharmacist, how her prescribing differed to that of others in the

team. She said that she had a more holistic approach. I tested this out with the next participant, Patricia (Nurse 1), who was a prescribing nurse and wrote the memo in Table 9.

Table 9: Memo 2.1.17 Prescribing pharmacists and nurses

There is a thread in the early interviews of pharmacists and nurses being aware of the pitfalls of prescribing and the consequences of getting it wrong - the things that can increase risk, for example, busyness, interruptions and then seeing the need to build in self-checks to ensure they prescribe accurately. There was a comment about medical staff not valuing the prescribing role in the context of the many other important things that they do. Is there something here about experienced (nurse and pharmacist) practitioners taking on a new, cherished prescribing role and knowing how badly it can go wrong? Being trusted with this and knowing that it's important to get it right? Check where does prescribing sit among or within the roles of the doctor?

My next two interviews were with Jayne (Doctor 2) and Sally (Doctor 3), experienced doctors. I asked them about their prescribing roles. I made this note immediately after my interview with Jayne:

Table 10: Memo 29.6.17 Initial thoughts immediately post-interview with Jayne (Doctor 2)

Jayne talked a bit about increased compassion, being able to speak more easily to patients and getting very positive feedback from senior consultants and the passion she has for her job. How it made her a better doctor. We were talking about growing in experience and about getting constant feedback that allows you to practice optimally. This was a very thoughtful individual and I felt a great empathy towards her. As I walked back after the interview I felt conflicted and challenged as this was not the doctor's approach that was being described by the earlier interviewees and it made me reflect on how easy it is to lose a level of impartiality during the interview process. I wonder how I can capture that and describe that conflict?

The interviews with Jayne and Sally helped open up the analysis and contributed to some new concepts and categories including those listed in Table 11.

Table 11: New concepts and categories following interviews with Jayne and Sally (Doctor 2 and Doctor 3)

- Making decisions in isolation – needing information.
- Prescribing can be mundane.
- Working automatically.
- Doing routine work.
- “Part of the daily grind.”
- Lack of full evidence base.
- Individualising drug therapy.
- Reviewing patients and medicines.
- Managing patients on a “day-to-day” basis.
- Making life or death decisions.
- On the job training- role models.
- Checking with the patient.
- Carrying out audit.
- Changing hierarchical structures.
- Making prescribing errors.
- Getting the best out of medicines for patients.

The detail of the questions that I ask of the data from Jayne and Sally’s interviews is in Appendix 15.

4.3.2 Using the Paradigm Model

I applied the Paradigm Model to the categories which had emerged. This allowed me to further analyse, order and integrate the data into emerging theory and also to help describe the final theory. Use of this Model in

particular helped me to structure the analysis and added rigor. I have included an example of the Paradigm Model applied to the category *managing risk* in Table 12. This later became the core category.

Table 12: Use of the Paradigm Model as applied to the category *managing risk*

Conditions • Importance of patient safety. • Increasing numbers of and complexity of patients. • Increasing numbers of, complexity and choice of medicines. • Multiple professionals inputting to care.	• Not enough time/capacity. • Lack of full evidence base. • Lack of information to make decisions. • Training environment – staff have different levels of experience.
Managing Risk – Properties • Managing risk. • Professional responsibilities. • Individualising drug therapy. • Reviewing patients and medicines. • Medicines management – medicines optimisation?	• Prioritising work. • No time to check. • Focusing on critical medicines. • “What we are all about.” • “Medicines safety is our thing.”
Strategies • Communicating. • Getting an accurate medication list. • Checking prescriptions. • Using rules of thumb.	• Checking with the patient. • Knowing what everybody does. • Developing new roles. • Knowing the evidence base. • Empowering patients and involving

• Learning the tricks of the trade. • Valuing multi-professional working. • Using checks and balances. • Prioritising the important things. • Adopting a structured approach. • Structuring the day around medicines rounds and ward rounds. • Managing workflow. • Managing patients on “a day to day basis.” • Having medicines available on the ward. • On the job training – role models. • Using specific medicines (doctors).	the patient in decisions. • Monitoring patients. • Encouraging reflective practice. • Highlighting errors. • Monitoring practice. • Auditing. • Confirming the list. • Reducing medical prescribing errors. • Learning from experience, experienced decision making. • Decision making at the right time, for example, multidisciplinary team, patient, notes available.
Consequences • Getting the best out of medicines for patients. • Providing safer patient care. • Making the best use of time. • Targeting high risk patients first. • Moving towards medicines optimisation. • Having the right people doing the right jobs.	• Reducing errors or making errors. • Improving staff morale and job satisfaction. • Improve patient outcomes. • Reducing stress, morbidity and mortality. • Allowing us to manage the resources we have.

One of the challenges for me was determining whether categories were conditions, strategies or consequences. I was applying the Model and it helped me to analyse what was happening and locate the flow of the

process, but sometimes these secondary decisions felt unnatural. I was relieved when I went back to the text (Strauss and Corbin 1998) and saw that I should be coding to help me gain an understanding of what was happening and not specifically for conditions and consequences. The authors used the following analogy:

> *Analysts who rigidify the analytic process are like artists who try too hard. Although their creations might be technically correct, they fail to capture the essence of the objects represented, leaving viewers slightly cheated. Our advice is to let it happen. The rigor and vigor will follow* (1998:129).

4.3.3 Developing categories in terms of their properties and dimensions

I used this approach which allows the researcher to see further linkages and patterns in the data to integrate into theory. An example of its application to the category *working with the complex and the routine* is outlined in Table 13.

Table 13: Properties and dimensions of *working with the complex and the routine*

Category	**Properties**	**Dimensions**
Working with the complex and the routine	Detail	High Low Complex Simple Interesting Mundane Unusual Routine
	Volume of work	High Low Heavy Light Constant Intermittent
	Feeling	Challenged Relaxed Stressed Relaxed Overwhelmed Well-paced Vulnerable Strong
	Having time	Sufficient Insufficient Long Short Under pressure Relaxed

This table shows the properties and dimensions of this category which came from the data. The list of properties increased as further interviews were carried out and some properties had more than one set of dimensions. This allowed me to compare different references in each interview transcript to *working with the complex and the routine*, group them together to help develop this category and integrate it into the theory.

This category, *working with the complex and the routine,* subsequently became the causal condition in the theory. It emerged from the earlier categories listed in Table 14.

Table 14: Categories which integrated into the condition *working with the complex and the routine*

- Working in a complex world.
- Doing routine work.
- Working under pressure.
- Needing information.
- Making prescribing errors.
- Changing systems (no standardisation).
- Medicines- a big thing.

Tables 15 and 16 show the properties and dimensions of some of these earlier categories, *working under pressure* and *needing information.* These overlapped with the properties and dimensions of the higher level category *working with the complex and the routine* seen in Table 13*.* This approach shows how they integrated into that higher level category.

Table 15: Properties and dimensions of *working under pressure*

Category	**Properties**	**Dimensions**	
Working under pressure	Volume of work	High	Low
		Heavy	Light
		Constant	Intermittent
	Type of work	Timely	Delayed
		Thorough	Incomplete
		Accurate	Inaccurate
		Complete	Incomplete
		Detailed	High-level
		Complex	Routine
	Having time	Sufficient	Insufficient
		Long	Short
	Feeling	Challenged	Relaxed
		Stressed	Relaxed
		Overwhelmed	Well-paced
		Vulnerable	Strong

Table 16: Properties and dimensions of *needing information*

Category	**Properties**	**Dimensions**	
Needing information	Quantity	Sufficient Detailed	Insufficient Scant
	Type	Accurate Complete Detailed Up-to-date Structured Summarised Evidence-base	Inaccurate Incomplete High-level Out-of-date Scattered Voluminous Lack of evidence
	Accessibility	Timely Easy At hand	Delayed Difficult Not available

4.3.4 Coding for process

Analysing data for process further helps to integrate the data and links categories, through connecting process with structure. Process can be routine or strategic and can change over time or remain the same. Participants described a number of processes including administering medicines, checking prescriptions and prescribing medicines. Questions asked of the data included, “what is going on here?” as well as, “does this change over time or within the dimensions of the sub-categories of the condition?” An example of this is the process of *reviewing prescriptions regularly* which was mentioned by all doctors, nurses and pharmacists. I was

interested in seeing what was going on here. The following diagram shows the sub-categories of the category *reviewing prescriptions regularly.*

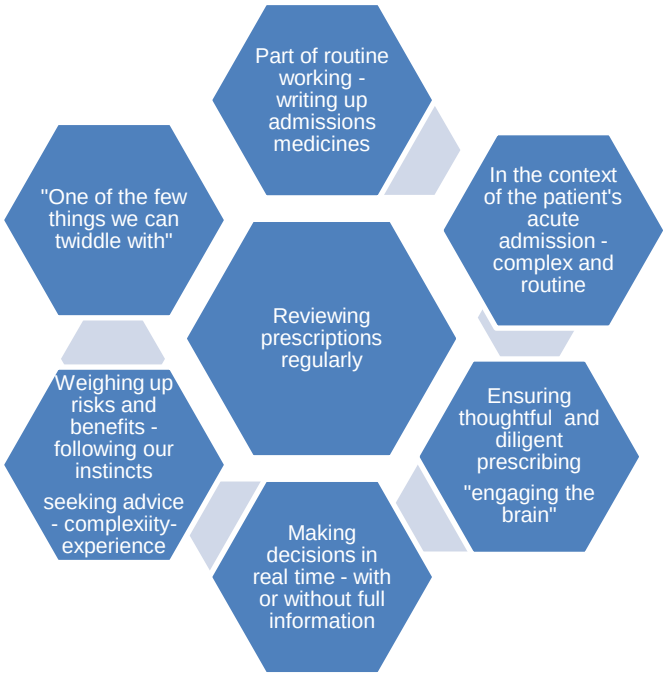

Figure 1: Sub-categories of the category reviewing prescriptions regularly – what is happening here?

Looking at the properties and dimensions of this early category, it became clear that this was a process which doctors, nurses and pharmacists were part of and which changed within the context of the condition *working with the complex and the routine*. Later in the analysis, the category *reviewing prescriptions regularly* became an action strategy and then was further integrated into the action strategy *using checks and balances*.

I also used coding for process to look at how and when medical staff prescribed medicines. Prescribing was described as a doctor's main role with medicines, and from the data, the role very obviously changes with the level, experience and increasing knowledge of the doctor. Prescribing is part of the sub-category *understanding roles and responsibilities* which was integrated into the core category *managing risk*. Figure 2 shows the progressive nature of the medical prescribing process.

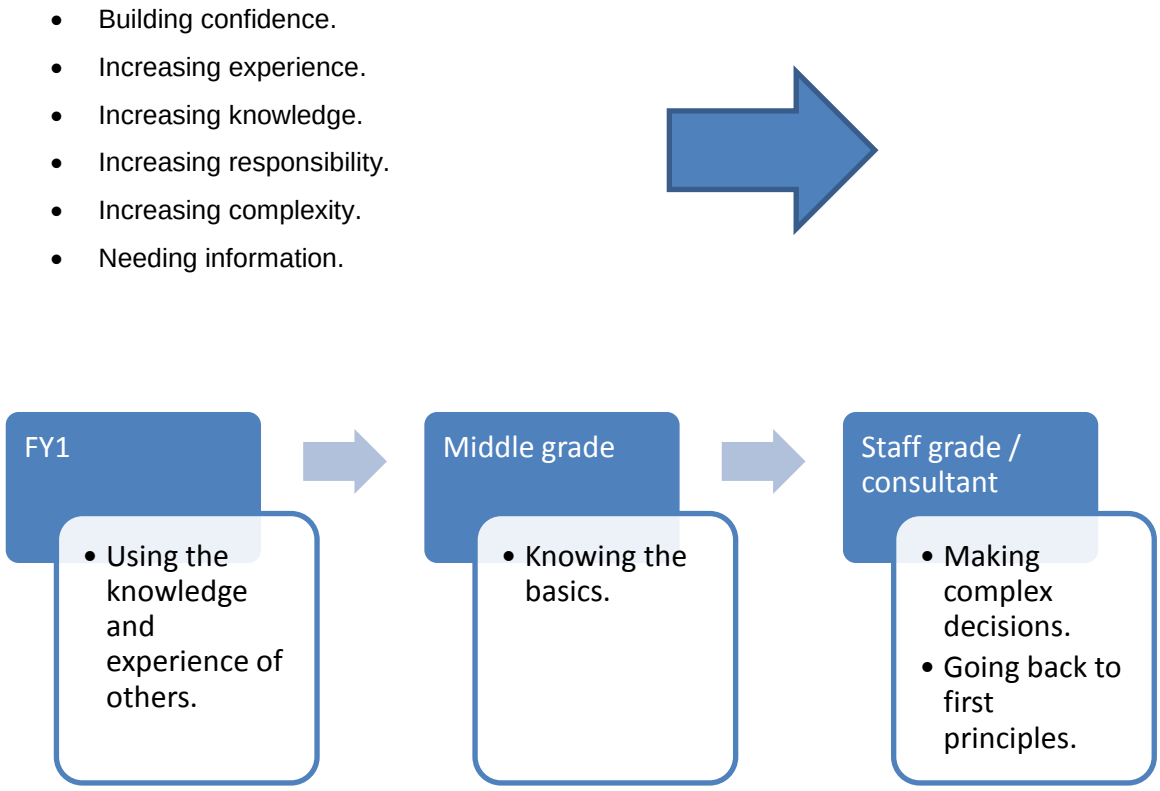

Figure 2: The progressive nature and process of the medical prescribing process

This figure shows movement, sequence and change in the medical prescribing process as the sub-categories of the condition change, for example, increasing or decreasing complexity or needing more or less information. This is outlined in further detail in Chapter 5.4.2, *managing risk.*

4.4 Selective coding

Strauss and Corbin defined selective coding as, "the process of integrating and refining the theory" (1998:161). In this section, I will describe how I did this, including descriptions and examples of the analytical methods which I used, for example, writing more in-depth theoretical memos, writing the storyline and drawing further diagrams, including a final integrative diagram in which links between the major concepts in the theory are illustrated. I will

also describe how I used this approach to decide upon the core category and integrate and refine the theory.

4.4.1 Using selective coding to decide upon the core category

Strauss and Corbin (1998) outlined the importance of the core category as coming from the data and giving, in essence, a short description of what the research is all about. It takes time to arrive at this stage.

In their later book, Corbin and Strauss (2008) wrote about the importance of taking time to think and, “allow sensitivity to grow and evolution of thought to take place” (2008:245). At this stage in my research, I took some time away from my job to carry out the selective coding process, to revisit the data, write memos, read and think. I familiarised myself again with the original codes, making sure that they were included in the analysis. I wrote further theoretical memos and continued to develop links between and integrate categories. I revisited some of the analytical methods which I had used previously, for example, using the Paradigm Model and I discussed my work with my research supervisors. From applying the criteria outlined in Table 4, and also from being immersed in the data, *managing risk* was emerging as the core category.

However my instinct was that there was something more and so I continued to write theoretical memos, revisit my codes and categories and make diary entries as I went through the data again. Line-by-line codes were typed into an Excel spreadsheet to facilitate easier reading and to make sure that no codes had been missed. This process also helped me to revisit the raw data on a regular basis and contributed to ensuring that the audit process was clear, improving the rigor of the work.

Strauss and Corbin (1998) outlined a number of analytic methods to help with integration and determining the core category. I used the following analytic methods throughout the research process and particularly in the latter stages

as part of selective coding, when focusing on integrating the data and seeking clarity about what was happening:

- Writing the story line - what is happening here?
- Using diagrams.
- Reviewing and adding to memos.

4.4.1.1 Writing the story line - what is happening here?

I used writing the story line from early in the research to summarise what was happening initially and to clarify my thinking. I also used it (from early stages) to make sure that I was using the data and not my personal bias and thoughts when analysing the data. However I found writing the storyline most helpful in the latter stages of integrating the data, when I needed to get a grasp of the data when I felt overwhelmed by it. An example of a later storyline from 3 April 2018 is in Appendix 16.

4.4.1.2 Using diagrams

Different types of diagrams for example integrative or process diagrams help the researcher to think more abstractly about the data. I used both types of diagrams at all stages of data coding and analysis, especially when looking at how processes linked with structure, the relationships between categories and integrating categories. I have included examples of two of these diagrams below.

Figure 3 shows systems and processes of what happened with medicines at each stage of the patient's journey.

All of the processes are surrounded by:

- Informed decision making.
- Training and learning on the job.
- Medicines optimisation diagram- is the patient at the centre?
- Different professional roles.
- Managing risk.

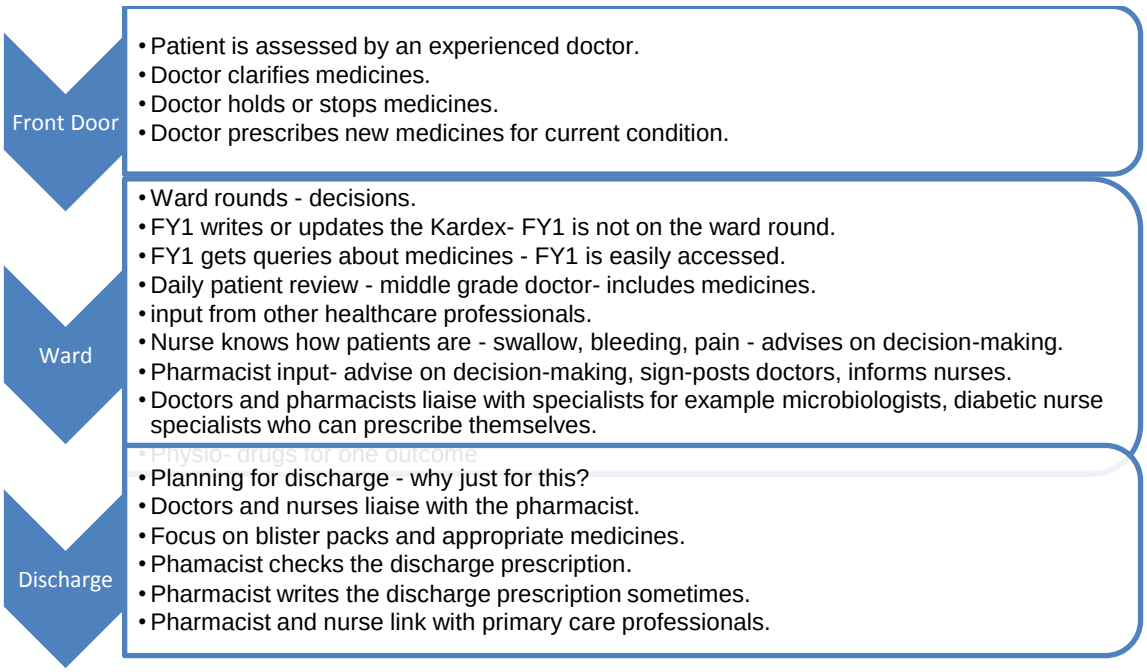

Figure 3: A flow chart showing the systems and processes of what happens with medicines at each stage of the patient's journey.

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Figure 4: The systems and processes of administering medicines (sub-categories of this early category).

4.4.1.3 Reviewing and adding to memos

I reviewed and added additional thoughts and comments to memos. This helped me to tease out more ideas, carry out further integration and ensure there was a logical flow in the developing theory.

4.4.2 Analysis by professional group

I was interested in developing a theory to explain how different healthcare professionals worked to use medicines effectively in acute hospitals (Section 1.1). A very early code was, having roles and responsibilities, and this, along with the research question, prompted me to ask a specific question about what the participant's and others' roles and responsibilities were with respect to medicines. As I interviewed participants and coded the data, it became apparent that certain codes related solely to one profession whereas others related either to 2-3 professions or were systems-related. I wanted to make sure that I captured this detail to ensure validity of the analysis and provide an audit trail. Through axial and selective coding, I linked and integrated codes derived from all participants. Some of these higher level categories remained profession-specific. In light of the research question, I noted any codes or categories that provided more in-depth information on the role of each professional group with medicines. This came from all participants as opposed to one professional sub-set of the sample. There were differing views of, for example, a nurse or pharmacist with respect to the role of a doctor with medicines and, in comparison, a doctor's view of their own role (see Tables 9 and 10). I tested out these roles in my questions to new participants from any profession to build a rich picture of what was happening here. There were also roles and responsibilities that almost all participants agreed were mainly profession-specific. This led me to group together some of the codes and concepts that related to the work of each professional group.

I built upon this in describing the core category, *managing risk* (Section 5.4). The aim of the research was to identify how doctors, nurses and pharmacists worked to optimise medicines and therefore I laid out the data on each professional group's role in managing risk associated with medicines, using participants' quotations. I then compared and contrasted these in the text.

It should be noted that this data came from an analysis of the data from each individual participant in the study using grounded theory methodology and not from individual professional (sub-group) analysis. The data on each professional may have been richer and more robust if I had analysed it by individual professional group, although I would have needed to increase the numbers of participants to achieve saturation in each group.

4.4.3 Turning to the literature for a unifying concept

I still had an open mind with respect to the core category, although *managing risk* seemed to meet Strauss's criteria listed in Table 4. I was reading the literature to develop my knowledge of the methodology further and I came across the term, "adapting to a changing world" with respect to staff working with dying patients in a number of palliative care wards in America (Glaser and Strauss 2015 reprint). This immediately resonated with the data for me.

Strauss and Corbin described researchers, "turning to the literature to look for a unifying concept which might fit their data" (1998:155). They went on to say that they did not do this as it may only provide a term which is a partial fit to the data and also may impair the researcher's creativity and development of the knowledge of the subject area. I had not turned to the literature to seek a unifying concept but at this point, "adapting to a changing world" seemed to be just that. I thought that this phrase gave a better description of what was happening than *managing risk*. However I did not like the way that I had come across the term and felt that I was forcing the data. This feeling was supported by Strauss and Corbin's reluctance to use the approach and also because, "adapting to a changing world", was not one of the initial categories.

There were categories which, on being revisited, could fall under this heading. I began to look at the codes (line-by-line and *in vivo*) to see if I had missed this and asked what is leading up to, “adapting to a changing world?” I analysed this potential category in terms of properties and dimensions derived from the data and attempted to incorporate it into a Paradigm Model. I discussed it with my supervisors. I let it sit and continued to analyse and integrate the data. In the end, “adapting to a changing world” was not a key category or a term which I used in the final integrative diagram for all of the reasons outlined above.

I continued to work on developing the storyline, looking at memos and constantly comparing the data from different interviews. One of the questions I was asking of the data was, “why do healthcare professionals speak so much about checking what they do?” Participants had referred to the initial prescription being incorrect or not having confidence in the accuracy of the prescription. I asked, “what is happening here? What reasons did the participants give for a prescription not being right?” The answers from the data to these questions are in Table 17.

Table 17: What reasons did the participants give for a prescription not being right?

- Lack of knowledge about the medicine.
- Inexperience.
- Lack of good information about the patient.
- Lack of good information about the medicines they are on.
- Insufficient information to make a decision.
- Lack of care – just made a mistake.
- Not knowing the system.
- The wrong person writing the prescription.

In reading through the transcripts and initial open codes of the doctors’ interviews, I saw that each doctor spoke clearly about focusing on getting prescribing right and using internal checks and balances. More junior doctors

spoke about feeling vulnerable when prescribing due to a lack of knowledge and how they managed this (their balances). By re-naming, *managing risk* as, *using checks and balances*, the core category seemed more whole.

As I was writing the chapters on the conditions and the core category, *using checks and balances,* I had problems in describing the core category as the data I was using was already integrated into the action strategies. *Using checks and balances* began to feel more like an action strategy than the core category. Also, it did not meet the criteria for choosing a central category as described by Strauss (Table 4). I went back to looking at *managing risk* as the core category.

I presented my findings to the University of Bradford's Medicines Optimisation Research Group (MORG) at this time. This group is made up of academic staff from a range of disciplines and PhD students. We discussed a number of key points including the core category. I laid out the data and background to *managing risk* and *using checks and balances*. The group had confidence in my analysis that *managing risk* was the core category, which was positively supported by data presentation.

4.5 The core category

Managing risk is the core category. All other categories relate to it and it was mentioned by all participants. It is described by participants as being inherent in what doctors, nurses and pharmacists do when they work with medicines. Each healthcare professional has their own *checks and balances*, based very often on their perception of risk and their experience with medicines and patients. The overall system in which medicines are used has a raft of formal and informal, in-built risk management strategies through interdependent working as well as guidelines, procedures and professional standards. I will describe these, with reference to the data, in subsequent chapters.

Managing risk as the core category fits Strauss's (1987 in Strauss and Corbin 1998) criteria and recognises the approach taken by doctors, nurses and

pharmacists involved in the use of medicines in acute hospitals in Northern Ireland. The data shows that involving patients, families and carers is part of this process which is central to medicines optimisation.

4.6 The final integration

Having decided upon the core category, I revisited the other categories, still using selective coding, to continue to build the theory with respect to conditions, strategies and consequences, ensuring that it flowed.

I described the development of the causal condition *working with the complex and the routine* earlier in this chapter. The strategies which emerged from the data were *using checks and balances, making the best use of resources* and *working together,* with integration of the latter two strategies into the single strategy, *working together.* These are described with examples of supporting data in the following two chapters. I found it difficult to determine the consequences of the theory. I have included a memo which shows my thinking on determining the consequence(s) in Appendix 17. This became *ensuring each patient gets the right medicines.*

The following integrative diagram gives an overview of the theory as it relates to the core category *managing risk*.

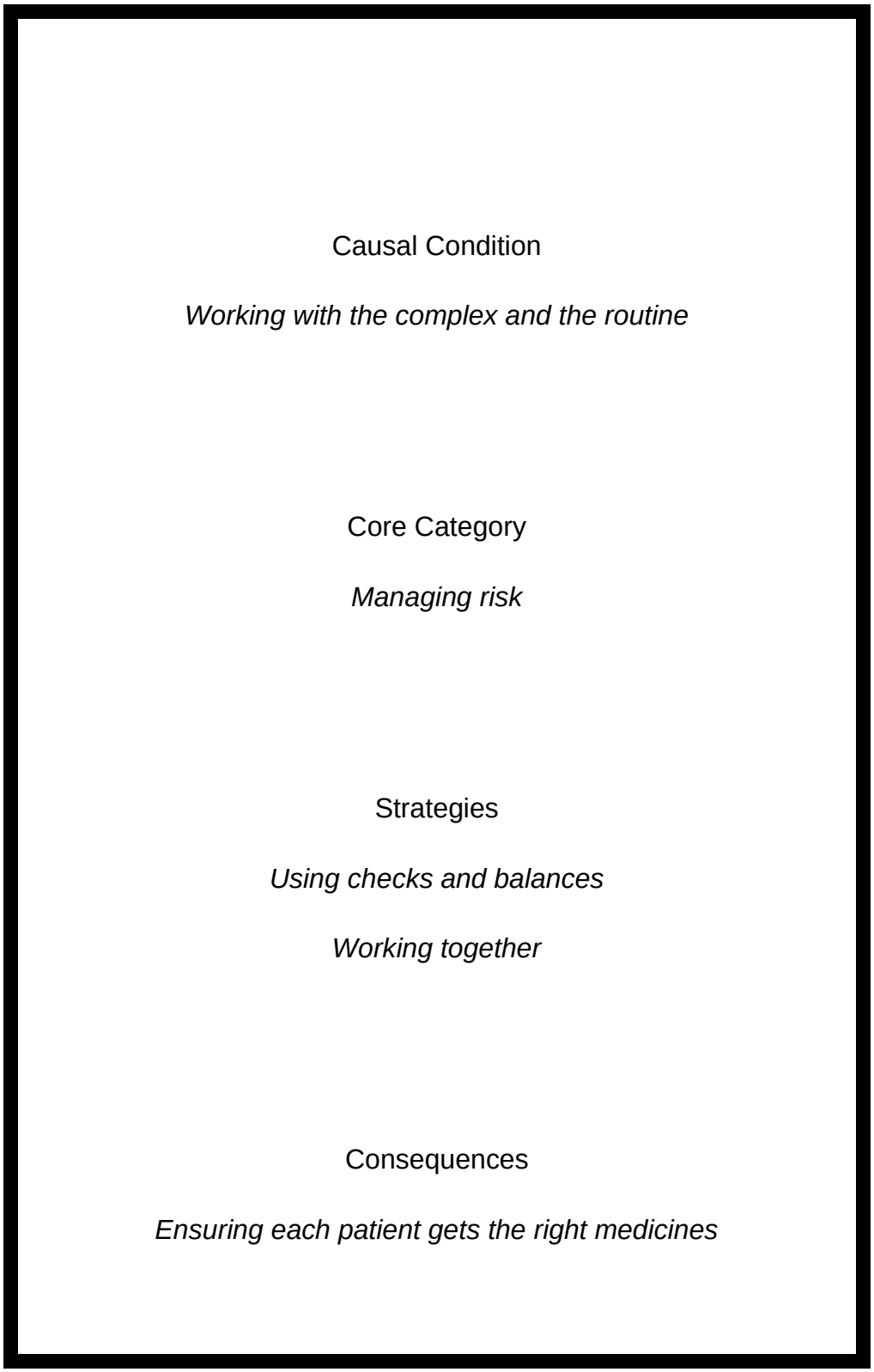


Figure 5: An integrative diagram giving an overview of the core category – managing risk

4.7 Summary

In Chapter 4, I have given detail of how I analysed the data in a step-wise fashion, using the tools outlined by Strauss and Corbin (1998) and ensuring transparency of process. A theory emerged, grounded in the data. This is shown in an integrative diagram in Figure 5, which gives an overview of the core category *managing risk.*

5.0 Findings - laying out the theory

5.1 Introduction

In Chapter 4, I described how the grounded theory was derived from the participants and data analysis. At the end of that chapter, I illustrated the grounded theory in an integrative diagram (Figure 5) which showed its structure and the inter-relationships between the categories (Strauss and Corbin 1990 in Creswell 2013).

Strauss and Corbin wrote about laying out the theory. They stated that in writing up findings from a grounded theory study, researchers should, "work out a main outline that will fully incorporate all important components of that story" (1998:251). In this chapter (Chapter 5), I will lay out the theory, initially providing a summary overview of the grounded theory. I will go on to describe the causal condition, *working with the complex and the routine* which leads up to the phenomenon (core category), *managing risk*. I will also illustrate the core category, *managing risk*, as related to the roles and responsibilities of doctors, nurses and pharmacists in *managing risk* associated with using medicines in acute hospitals in Northern Ireland.

In Chapter 6, I will outline the different strategies used when *managing risk* as defined by participants. These are *using checks and balances* and *working together.* I will also describe the consequence of *managing risk* which is *ensuring each patient gets the right medicines.*

5.2 A summary overview of the grounded theory

The causal condition, *working with the complex and the routine*, emerged from the data. *The complex* related to the number and range of medicines used, having sick patients with multiple co-morbidities and the challenges and additional workload associated with this. It also described the complicated and busy healthcare system in which participants worked. *The*

routine was referred to mainly by medical staff who described the daily work with prescriptions as being mundane ("grunt work") but important to get right. They spoke of constantly having to engage and focus when prescribing. A lot of this work was seen by medical staff as being of lower risk and so it was carried out by less experienced doctors in training. Errors occurred in both complex and routine scenarios. Participants described *working under pressure* and needing accurate and timely information to make good decisions. Sometimes there were no specific guidelines available on using a medicine in a particular group of patients or the professional needed to ask questions before they were able to complete tasks, for example, prescribe, administer, clinically check or dispense a medicine. Participants spoke of striving to do a good job and ensuring patient safety. They spoke about learning about medicines on the job with many of the medical staff who prescribed medicines being in training posts. Participants suggested that the database outlining each patient's medicines list (the electronic care record) was not always up-to-date and mistakes could be made in particular at the point when a patient was admitted to hospital. All of these issues which made up the causal condition led up to the core category, *managing risk*.

All participants spoke of *managing risk* as they worked with medicines, both as individual practitioners and together with other members of the multidisciplinary team. Patient safety was named as being most important to all and each participant spoke of striving each day to do their best. However there was a range of things which did not support them in doing this including a lack of time, not being able to access the right information on medicines when needed, not having the experience to prescribe medicines and having to constantly ask questions to make sure a prescription was correct, or understand why a drug had been prescribed. Pharmacists and nurses spoke of how they had learnt not to take a prescription at face value.

Participants developed different strategies for *managing risk*. There were both individual and system-related strategies and they were usually influenced by the professional group which the individual belonged to, their level of experience and knowledge, as well as a personal assessment of how to manage each risk. Strategies included *using checks and balances* and

working together. Nurses and pharmacists spoke of taking on new roles, for example, prescribing, having dedicated “medicines nurses” on the ward and filling in gaps in prescriptions to help the healthcare system to flow. The role of the ward-based clinical pharmacist was highlighted by everyone as being an important check in the system. The overall system seemed to be constantly adapting in *managing risk*. Individual professional groups modified the way they worked, with examples of focusing specifically on higher risk situations; giving critical medicines on time, carrying out therapeutic drug monitoring and reconciling medicines on admission and discharge. Decisions could be made with the best information available at the time and because everyone knew this may not be up-to-date or accurate, additional checks were built in at every stage around the use of medicines. Many staff described being supported by their colleagues in all professions. Medical staff relied on there being certain checks in the system to allow them to address their workload, for example, knowing that a pharmacist and nurse would both be checking what they had prescribed before it reached the patient.

There were consequences or outcomes associated with the strategies which the participants used or which were built into the system. These were incorporated into one consequence, *ensuring each patient gets the right medicines.* However strategies were not always successful, patients did not always get the right medicines and the design of different parts of the system did not always support participants in making the best use of resources when using medicines. This sometimes resulted in medication errors, with professionals feeling that they were not doing as good a job as they would like to and feeling tired and stressed. Each person spoke of making decisions about medicines in the context of each individual patient, with the beginnings of a change in approach to involving patients and carers in the decision-making process. This was part of a change in power structures, away from the traditional medical hierarchical model towards truer multi-professional decision making.

In developing the theory I have made some analogies; one with an orchestra which is playing a symphony and the other a visual comparison of the medicines management system looking like the RISE sculpture (the largest piece of artwork in Belfast). These are presented in Tables 18 and 19.

Table 18: Analogy of an orchestra

Using a musical analogy, the theory compares to an orchestra playing a symphony in harmony. To do this well, each musician has to listen to each other, take their cue from each other and the conductor. The symphony can be interpreted differently by different conductors even within the composer's marked directions. Musicians need to be able to read the music, know how to play the instrument and to read and adjust their playing in line with changes in dynamics and speed. Some of the musicians, for example, the first violins, usually only play the melody. Some have to fill in and complete the harmony, for example, the violas could have a nervousness of playing the occasional tune. In optimising medicines, there may not be one conductor and perhaps that is what is needed to help in *managing risk* or reduce the risk in the system.

Table 19: RISE sculpture (Belfast)

Visually I see the system of optimising medicines as a huge ball with the different individuals involved and strands of strategies linking together around the outside to maintain an intact surface. Together all of these strands form a complete ball (similar to the RISE sculpture in Belfast) but each is fragile as are the links and the overall structure could collapse. The questions for me are, "do we want to make this ball a more stable structure?" and, "what do all healthcare professionals need to do to enable this to happen?"

5.3 Causal condition

5.3.1 Introduction

In Chapter 4, I described how I analysed the data using the Strauss and Corbin (1998) approach to grounded theory. I outlined the phenomenon in an integrative diagram (Figure 5), showing the relationships between the core category *managing risk*, its causal condition, the strategic and routine actions and interactions (strategies) which arise under that condition and the outcomes or consequences of these.

Strauss and Corbin described the causal condition as, “forming the structure or set of circumstances in which phenomena are embedded” (1998:128). The core category, or phenomenon, is *managing risk*. Healthcare professionals described *managing risk* within the context of *working with the complex and the routine* (causal condition). In this section, I will now present the causal condition, w*orking with the complex and the routine* using supporting data (participant quotations).

5.3.2 Working with the complex and the routine (causal condition)

The condition, *working with the complex and the routine*, is made up of four elements. Some of these had also been listed as separate conditions at an earlier stage of the analysis but through integration, it became clear that they all make up parts of this one overarching condition.

These elements are:

- Working in a complex system.
- Doing routine work (with medicines).
- Working under pressure.
- Needing information.

Participants described *working in a complex system* due to the range of medicines available for use, their side-effects and the potential for multiple drug interactions, the multiple co-morbidities of patients in acute hospitals as well as the busyness of the overall healthcare system. Pharmacists and doctors are using an increasing number of medicines, many of which had serious side effects and interactions with other medicines. Rebecca (Pharmacist 1) spoke of the changes which she has seen in the increased availability of new drugs since qualifying in 2012:

> *None of the NOACs were out [in 2012]. So you had no apixaban, edoxaban or dabigatran - you were just going down the warfarin line, aspirin, enoxaparin. So there is a lot more availability of medicines to prescribe but with that comes, I would say, a lot more uncertainty. Doctors aren't just as sure because how do you choose between apixaban and rivaroxaban...an awful lot more uncertainty with the side-effects. So you are getting more enquiries about can this drug cause this, is this patient suffering from this*? (P1p7).

Sally (Doctor 3) spoke about the need to understand how to use new drugs:

> *Particularly with the introduction I think with the NOACs. Lots of problems! New drugs, new concepts (*D*3*p3).

Jayne (Doctor 2) commented:

> *There are so many drugs out there and so many doses and so many caveats too. If this person has liver impairment or renal failure or they are pregnant, then you can't give it or you need to adjust the dose* (D2p4).

Later Jayne spoke of her concerns about polypharmacy:

> *If you are on lots and lots of medications, then there is no way of really knowing - if you are on a drug and you develop a certain symptom, the tendency is to just say, "oh right well we*

> *have a drug that can help with that symptom as well." So it just keeps adding up and up* (D2p7).

Doctors and pharmacists described using more medicines to prevent as well as treat disease and the importance of rationalising these. An example of this is stopping a preventative drug such as a statin when a patient is reaching the end of life, to help to reduce the unnecessary complexity of polypharmacy.

Most doctors and pharmacists spoke about the increasing age and the level of acuity of the illness of patients in acute hospital beds. Sally (Doctor 3) said that patient complexity and age were key influences on her prescribing decisions:

> *I think patient complexity. For me, age is a big thing and when I am reviewing drugs, for example, I think risk versus benefit* (D3p2).

Rebecca (Pharmacist 1) spoke of her work as being patient-driven and having variation due to the fast throughput of patients. She talked about the quick turnover of guidelines and at times, feeling overwhelmed by work.

Jackie (Nurse 3) described how having a lot of patients, some on critical medicines, meant that the frequency and duration of medicines administration rounds had increased. She described what she did on medicines administration rounds:

> *They [patients] are on a lot of different medicines but they are all very different and then at lunchtime we will be doing orals and iv medications because we have a lot of people on antibiotics and iv furosemide and a lot of different tablets and injections as well* (N3p3).

Caroline (Pharmacist 5) described the complexity of using antibiotics with a narrow therapeutic index. She spoke of the advice she would give to doctors about using gentamicin:

> *It is trying to get an idea into the doctors' heads that the concern is that we don't want this level to be too high because we are worried about the patient's kidneys or their ears or whatever it may be* (P5p14).

Karen (Pharmacist 2) described the following changes:

> *There is more medication available, we are keeping sick patients alive longer, so there are people living with a lot more co-morbidities than maybe they would have before. So the ones [patients] that we are managing in hospital are probably people who wouldn't have survived in the past. The straightforward patients don't come into hospital any more* (P2p16).

She also spoke about the complex process of administering medicines in hospital:

> *So you know how complicated it is now and even in terms of administration, lots of different [intravenous administration] lines that our patients have in and some of the antibiotics can't go through mid-line, some of them can. So even for nurses, knowing what they need to ask can be complicated* (P2p14).

Doctors, nurses and pharmacists described having a number of patients who used compliance aids and who needed help in taking their medicines. This added to the complexity of organising their discharge.

All healthcare professionals interviewed made reference to correcting and learning from medication errors. Deirdre (Pharmacist 4) asked whether increasing complexity has increased the level of risk in the system:

> *..getting the pharmacists, doctors and nurses to do reflective reports on why things went wrong and how they can change their practice to ensure it doesn't happen again. That is so valuable and you start to wonder were things always going wrong to the same extent all those years ago or is it now, just*

> *the complexity of things that have increased the number of times things go wrong* (P4p7).

The data showed that a lot of time and focus was given to *doing routine work with medicines*, for example, writing Kardexes and discharge letters. All participants made some reference to having to do routine work with medicines which filled the gaps in prescriptions and helped the system to flow; however, *doing routine work* was specifically spoken of by doctors. Some of this work, from the medical perspective, was looked upon as being of relatively low risk and was assigned to Foundation Year 1 (FY1) doctors. Such work was also described as being mundane. Sally (Doctor 3) commented:

> *Linking-in medication appropriateness and blister packs and all that - medication is a big part of the daily grind* (D3p2).

Later, she commented:

> *[Prescribing] can easily become a mind- numbing process where you engage no thought. That is bad practice and I am, on the ward rounds, I am telling the juniors, "always check the Kardex"* (D3p7).

Jack (Doctor 7) described his role as doing what the Foundation Year 2 doctors (FY2s) do not have time to do because they are doing the medical planning. His role involved:

> *Sort of you carve out the administration stuff with the grunt work, prescribing medical care, fluids, bloods etcetera, that say haven't been gotten round to by the SHOs [FY2s] or the phlebotomists. It is sort of the loose ends when we come along and tie them up* (D7p4).

He was unclear about his prescribing role:

> *In terms of actually a prescribing role, it is very unclear. I never really know exactly when to say no and when to say yes. It is*

more just I tend to say yes because it is a learning experience, everything is, so yes is usually a better answer, I find (D7p3).

He continued to describe the types of drugs which he was confident to prescribe for example, most routine antibiotics, and of having a threshold of where he called for help which was subjective and depended on how sick the patient was.

When asked if there were specific roles for different grades of doctors, Sally (Doctor 3) commented that she usually writes the initial Kardex at the point when the patient is admitted to the Emergency Department, however FY1s wrote Kardexes on the ward:

On the wards, generally the F1s would be writing the Kardexes. That task is often left to them. I think other times the nursing staff, if they have a query with the medications, they will go to the F1 first, even though the F1 will not have been on the ward round (D3p2).

In the midst of the busyness, doctors in particular described, "*needing to engage the brain"*. This was an *in vivo* code used by Jayne (Doctor 2) when she described the importance of focusing on prescribing medicines:

At a basic level, we are responsible for prescribing medicines, so we have to be extremely careful with what you are writing down. It can be very monotonous. It is just something you do without thinking, for example, prescribe paracetamol, but with more experience as a doctor, I found that you really need to engage your brain when you are thinking about medicines (D2p1).

She described how challenging prescribing was and used the analogy of being a good driver:

I would say it is like being a good driver. You can go on autopilot and just not engage your brain and that's how accidents happen because you won't notice somebody cutting

> *in in front of you or you are looking to change lane and someone has just flown up beside you. If you are fully engaged with what you are doing, every time you drive then you are going to be much safer* (D2p9).

So the mundanity, routine nature and lack of stimulation involved in working with medicines also seemed to contribute to the need for doctors, nurses and pharmacists to have to focus on *managing risk,* as identified as the core category. Doctors, in particular, strongly highlighted the potential for making errors if they did not focus on what they were doing.

With increasing complexity and volume of work, each professional group made reference to carrying out a number of important tasks to keep the system moving forward and constantly having to prioritise. They described *working under pressure* as a result of not having enough time to carry out tasks, not having enough staff and the increasing throughput of sick patients who needed care.

Shirley (Nurse 2) described the increasing pressures on nursing practice:

> *Between being busier, short staffed, more patients, trying to get all the tablets at the set times and also interruptions. You are not meant to be interrupted when doing the medicines but it still happens* (N2p8).

Jack (Doctor 7) was asked if his practice changes when he is busy. He described living in the real world:

> *It is not as we were trained in that you are one guy or girl with one patient and you have to take a full examination etcetera. That is a very distant memory it seems now. That aspect of it changes dramatically under pressure and everyone is rushed and shortcuts are taken inevitably. You take shortcuts when you can and when it is safe to do so* (D7p5).

Joan (Doctor 1) agreed:

> *Your training is so far removed from what it is like today to deal with a real sick person, especially as they become more and more complicated* (D1p12).

Doctors described not being very well trained on how to prescribe. The doctors who did most of the prescribing were doctors in training posts. Mary (Doctor 5) commented:

> *You go off in medicine and you have never prescribed a medication at all but yet you've got a Kardex in front of you and you have to prescribe and put your name to something* (D5p21).

She described being concerned about having little time to go home and learn more about some of the things she had come across during the day due to busy shift patterns. Her usual practice was to make lists of things to look up at home:

> *I have only had one day off since starting here a few weeks ago, so that is something I want to read up on as I don't like it and it makes me feel very uncomfortable to prescribe something I have no knowledge on* (D5p24).

Jayne (Doctor 2) described working with medicines as being a, "big thing," which involved making life and death decisions. With this, along with the increasing complexity and volume of work, comes a need for doctors, nurses and pharmacists to access sufficient, accurate information easily to support them in making good decisions. Such decisions included prescribing the right medicine for a patient (all three professions), deciding that a medicine was safe to administer (predominantly nurses) and deciding whether to query the accuracy or appropriateness of a prescription (predominantly pharmacists as well as nurses).

All participants spoke about times when they did not have accurate information. Jack (Doctor 7) mentioned accessing potentially inaccurate medicines' information using the Electronic Care Record (ECR):

> *Actually very often now the drug history, because we rely on ECR so much from that which is a poor data setting and a poor list of medications anyway, we don't really do drug histories any more…but the thing is, the ECR GP meds form is not strong enough to replace it* (D7p8).

Nurses and pharmacists also spoke about using ECR routinely and described its benefits and pitfalls. Shirley (Nurse 2) said:

> *So they [doctors] usually get most of their information off ECR and this unfortunately can be quite rushed. So there would be mistakes, normally in the first day there could quite often be mistakes. ECR maybe hasn't been updated, so if the patient tells us that they don't take that anymore then we would always hold back and check it out with the pharmacist* (N2p8).

So introducing technological solutions contributes to changes in basic practice, such as taking a medication history, and new ways of working. Being aware of the strengths, with knowledge of the weaknesses, in any new system is important in ensuring any risk associated with change can be managed.

Sally (Doctor 3) spoke about having to make a decision at a point in time and the importance of being able to access the right information easily, for example, prescribing an unfamiliar drug when on a ward round and not being able to access the British National Formulary (BNF). The consequences of this were that the drug would be prescribed with the intention of coming back later to check it. It was acknowledged that this could cause problems for someone else down the line if the doctor did not get back to see the patient and check that the prescription was accurate, due to workload. She said:

> *I think mistakes with unfamiliar drugs are very easy to make, very easy to make. It is fantastic having the online BNF. I do miss having a BNF at the bedside / on the trolley; when your phone cannot get a signal. People think, I will just prescribe this now but I will check this later and then you have sometimes fifty people to*

see. It would generate a lot of work for somebody else and would stop someone from going home that day. So I do miss the paper BNF (D3p4).

In comparison, Caroline (Pharmacist 5) spoke about doctors sometimes taking the opposite approach and not prescribing the drugs which they were uncertain about when a patient was admitted. This could mean that medicines were missed and also required follow-up, usually by a pharmacist.

Junior doctors (FY1s) also spoke about being expected to carry out lots of different roles, including prescribing or re-writing medicines when they did not have a lot of information about the patient and/or the medicine. Jack (Doctor 7) was interviewed in the middle of a busy shift, having worked all weekend. He described living in the real world:

> …*once you've seen the patient and making management plans, you do everything within your power…I don't think anyone should be prescribing things without having a really good grip on the patient, especially not having seen them. Doing that is a great mistake I think and so I don't do that [prescribe] without having seen them …but time pressures make it very difficult* (D7p5).

He continued to describe the pressure of the prescription not being written until he saw the patient:

> *If you say you are going to come and see them and the nurse is a bit standoffish, then the person that suffers at the end of all that, apart from the nurse getting frustrated and then you getting frustrated, is the patient sitting there with the temperature* (D7p5).

When asked how he would design a better system to manage medicines in hospital, Jack (Doctor 7) said he would like an electronic Kardex which the patient has from the GP which would follow the patient through the hospital. He explained:

> *I think a lot of the issues that there are with medicines are people who are unsure when they come in what medications they are on, whether they are taking their medications or not and then when you come to discharge, you are discharging them based on what you think they were on beforehand and if you get it wrong at the start, it is very difficult going back* (D7p17).

He described this as being a particular concern with warfarin in older people who had had unplanned admissions.

Mary (Doctor 5) had a role in re-writing Kardexes:

> *Obviously when you are re-writing them we wouldn't have the time to actually go to the patient and clarify things and make sure these are definitely right – so there is that safety aspect that is probably missed* (D5 p5).

Mary used a range of methods to support her decision-making, including looking to see if the pharmacist has signed for checking the prescription and prescribing with the comfort of knowing that someone else had written the original prescription.

Mary described being expected to sign prescriptions for items which she was not fully knowledgeable about:

> *They have a pile of them [prescriptions] and they say, "would you mind signing these?" and I'm like," what is this on my first day?" and they say, "it is just a quick signature"….I was saying, "I don't know, this isn't something I am familiar with," but yes they were persistent so I did fold* (D5p25).

When describing re-writing medicines which had previously been prescribed by another doctor she said:

> *I have joked about writing cheques with it because they could have anything in front of me and I know I have to sign it so I have no choice to sign it* (D5p24).

Mainly pharmacists spoke about being unhappy to make decisions when they were not in possession of all the facts. Karen (Pharmacist 2) spoke about making fully-informed decisions, especially when prescribing:

> *Sometimes I will make a decision. I don't necessarily have to speak to a doctor but I think on the ward you are very much seen as part of the multidisciplinary team and the consultant is still the person with his name above the patient's bed. So I wouldn't want to put myself in the position of changing something maybe if I didn't have all the information and him having to question that at a later stage* (P2p3).

Nurses spoke of holding off on administering a medicine if they were unsure if the prescription was correct. When asked what her most important learning was relating to medicines, Shirley (Nurse 2) said:

> *Not to trust the Kardex. If there is a gut feeling that it is not right or you are not 100% sure, then always check it out* (N2p6).

She described seeking information initially from a pharmacist and then approaching the doctor.

In describing her own prescribing practice, Angela (Pharmacist 3) said that her ideal world would be getting more information from patients to help make better, informed decisions:

> *You have no time to actually properly chat with someone and see what they want to do or just sometimes making decisions and going with it because there is just no time to do it any other way* (P3p17).

Only the senior medical staff spoke about having to make prescribing decisions in situations where no evidence-base existed. Sally (Doctor 3) said that this was a relatively common occurrence at her level of practice (Specialist Registrar) and described following her instincts:

> *Like increasingly, one of my gripes is the fall in a patient on a NOAC. Someone comes in, falls ten times with bruises left,*

right and centre. Do they really need to be on it? There are no real guidelines for that. Different people do different things. There is no real evidence, like the blind leading the blind. The harm of stopping a NOAC is a massive stroke. The harm of not stopping a NOAC is a massive bleed but we need to have a feel for those kinds of figures. So we may just hope and pray and take our chances (D3p6).

Some participants also described having too much information which took time to assess to help make decisions, with Deirdre (Pharmacist 4) commenting:

The amount of work involved in getting the medication right on admission - medicines reconciliation takes a lot longer even though we have got emails and the ECR GP medication form to print out. The access to all that extra information means we have to go that bit further to make sure everything is right. So the amount of time that it takes a pharmacist to check the different sources and get the right medicine prescribed when they are in hospital, checking the Kardexes are right and communicating with the doctors when things aren't right and getting things changed – it takes a lot longer (D4p6).

5.3.3 Summary

In this section, I have described the condition, w*orking with the complex and the routine* in terms of its four elements; *working in a complex system, doing routine work [with medicines], working under pressure* and *needing information*. Participants spoke about treating patients in hospital who are sicker than those they had treated in the past. They also highlighted being able to use a greater range of medicines with potentially increased benefits but also potentially greater risks for patients. Alongside this is the volume of routine tasks involving medicines which need to be completed. Participants mentioned feeling overwhelmed at work and *working under pressure*, not having enough time or having to care for a patient with complex needs. They also described not always having access to the right information (either inaccurate or unavailable) to support their decision-making. All of these elements can increase the possibility of medication errors occurring. Doctors, nurses and pharmacists all spoke about having a professional responsibility to provide safe care for patients. In order to do this, healthcare professionals are *managing risk* in the system to keep patients and staff safe. In Section 5.4, I will describe the core category, *managing risk*.

5.4 Core category

5.4.1 Introduction

In Section 5.3 I outlined the conditions which led up to the core category. Bluff (2005:156), states that, “the core category or storyline needs to be evident and demonstrate how it links all the data.” In this section, I will explain the core category, *managing risk*, with reference to the data. I also will outline the roles of doctors, nurses and pharmacists in using medicines and *managing risk*.

5.4.2 Managing risk (core category)

The category *managing risk* was an early *in vivo* code and it also was a code which I used when carrying out line-by-line coding.

Participants were *managing risk* to ensure patients are treated well. They described managing both individual patient risk as well as risk in the whole system.

Participants' approaches to using medicines sat within the context of recognising and continually managing the risk in the medicines process each day. Frank (Doctor 6) described this as:

> *Managing day-to-day risk with the inpatients that I am largely involved in - a Kardex gets reviewed every day, administration gets reviewed every day and missed drugs and so forth. The nurse would be very good at highlighting if somebody has not been able to take medication and our pharmacist checks each admission, will check that all the routine drugs have been prescribed, that the additional drugs have been prescribed or certainly double-check with either myself or one of the consultants why something has been omitted or changed* (D6p11).

In this quotation, Frank outlines a continuous and dynamic process of *managing risk* which involves all three professional groups carrying out specific tasks each day. In carrying out these roles, all participants are acknowledging the risk of being involved in a medication error which has the potential to harm patients. It was inferred from the data that such errors usually did not reach the patient due to the system having built-in checks. The phenomenon is having all three professional groups, continually and actively, carrying out specific tasks each day to manage risk in the medicines process – *managing risk*.

When carrying out my analysis, I asked the question, "*why do healthcare professionals manage risk when using medicines?"* and I have listed some of the reasons which came from the data in Table 20.

Table 20: Why do healthcare professionals manage risk when using medicines?

Why do healthcare professionals manage risk when using medicines?	Not having all the information. Because risk is everywhere. Medicines are a risky business. We have inexperienced staff. Different levels of risk. Prioritising high risks only. Not fully owing tasks. Knowing someone else has your back. Complexity and acuity. "Doing the grunt work." Learning on the job. Dancing to the beat of a different drum. Knowing there are safety nets. Lots of players. Interdependencies. Needing to make the best use of time. Needing to provide safe patient care. Needing to do the best we can for patients.

Most of these phrases are integrated into and elaborated on more fully in this section as data.

The need to manage risk came from *working with the complex and the routine*. There seemed to be uncertainty in the appropriate use of medicines. Jackie (Nurse 3) asked questions when she wasn't sure about the accuracy of a prescription:

> *It is my role to question something if I wasn't sure about it, then I would have to go and ask somebody else before I would give it* (N3p8).

Doctors and pharmacists also spoke of asking questions and seeking clarity about prescriptions. When using medicines, there needs to be a high level of certainty to make sure that well-informed decisions are made. This is because the outcome of making an error with a medicine can be fatal. It is interesting to see how this fact impacts on how doctors, nurses and pharmacists work with medicines and what their roles are.

There were a number of references to certain consultants *managing risk* by using particular medicines which they had more experience in using. Different healthcare professionals illustrated this, for example, Rebecca (Pharmacist 1) commented:

> *There is a lot more for people to prescribe and in that then I can definitely see preferences with consultants, what they prefer to prescribe. Like our cardiologists, one loves ticagrelor, the other hates it because of the bleeding risk, would only go for a loading dose of clopidogrel. So there is an awful lot more variety in prescribing and in that then there is an awful lot more uncertainty with the side effects* (P1p7).

This was reiterated by Jayne (Doctor 2), who said:

> *I have actually found that with the more senior doctors in the hospital as well, if you go to one, they would suggest one drug and then you would go to another and they would suggest*

> *something different. For each of them, that's their number one choice for it and they have their own reasons for choosing that* (D2p6).

This variation in prescribing between consultants also can introduce risk into the system which is minimised through the clinical team inherently knowing and managing each consultant's preferences.

Each healthcare professional interviewed described a range of systems and processes which governed the use of medicines in their day-to-day practice. I will outline these in more detail in the action strategies as they describe how individuals manage risk. The sheer number of processes and rules could be seen as signposting that using medicines is a risky process. (This was also commented on when I presented my initial findings to the University of Bradford Medicines Optimisation Research Group. I was asked if we are conditioned to fear medicines-related processes because of the volume of systems controls in place which possibly implies that they must be risky processes).

On my way to interviewing Cathy (Nurse 4), I heard a retired senior healthcare manager speaking on BBC Radio Ulster about the outcomes of the Inquiry into Hyponatraemia-related Deaths in Northern Ireland which had just been published that day (Crawley and Compton 2018). John Compton commented that healthcare is all about *managing risk*. In this context, I asked Cathy if she agreed with the comment. She looked uncomfortable but her response was more positive than her body language. She agreed with the statement but developed the conversation to include protecting nurses as well as patients:

> *We are always managing risk. I suppose yes, some of it is all about managing risk and I think everyone is so afraid and so it is always about making sure that we have protected ourselves as well as protecting our patients* (N4p11).

A number of participants made reference to giving critical medicines on time. There seemed to have been a recent effort in each of the hospitals which I visited, to educate clinical staff on what critical medicines were and the importance of administering them on time. Jack (Doctor 7) mentioned that critical medicines may often be highlighted on prescriptions with a marker pen, for example, anti-epileptics, drugs to treat Parkinson's disease. He said:

> *I think that the nursing staff had a list of which patients had critical medications that needed to be administered on time* (D7p13).

This comment highlights two points; firstly that a risk-based approach was being taken to ensure the timely administration of medicines but secondly that there was a need for such an approach (possibly because the current system for administering medicines could not guarantee that critical medicines would be given on time). This links with the causal condition, *working with the complex and the routine*.

I had asked each participant what each of their roles and responsibilities were as a doctor, nurse or pharmacist as well as the roles and responsibilities of the other two professional groups. Most comments included roles which mentioned medication safety and fell under the category *managing risk*. When *working with the complex and the routine*, it is important that each person understands their own role and the role of others. I have summarised the data in Table 21. The role(s) referred to by almost all participants is in bold type. The responsibilities are listed in the order of how often they were mentioned.

Table 21: Participants' views of the roles and responsibilities of doctors, nurses and pharmacists in acute hospitals in Northern Ireland

Professional	Main role(s)	Responsibilities
Doctors	**Prescribing.** Administering intravenous drugs which nurses can't administer. Filling the gaps – junior doctors.	Medication safety. Ensure the prescription is correct, has a start date, signed and accurate times. Patient care.
Nurses	**Administering medicines.** Signposting doctors. Seeking clarification. Ordering medicines. Signing off requisitions. Prescribing.	Ensure the patient gets all the medication they are prescribed. To administer the right medicine, the right dose, by the right route at the right time for critical medicines. Medication safety. Patients. Keeping themselves right.
Pharmacists	**Checking prescriptions.** Reconciling medicines. Reviewing medicines. Prescribing Getting medicines ordered from pharmacy [technicians]. Discharge focus. Highlighting problems to doctors. Answering queries. Reassuring nurses. Getting changes made. Tying up loose ends. Signposting doctors.	Managing medicines risk. Medication safety.

The aim of the research was to identify how doctors, nurses and pharmacists worked to optimise medicines. *Managing risk* has evolved from the data as the core category. Therefore in this section, I will lay out the data on each individual profession's role in *managing risk* associated with medicines and then I will compare and contrast these.

Prescribing was named by everyone as being the doctor's main role with medicines. Sally (Doctor 3) described it as a dynamic process, in which there needed to be regular checks and focused decision- making. She talked about her professional responsibility in personal terms:

> *The first responsibility is patient safety - I think that overrides everything, including your personal pride!* (D3p6).

Sally added:

> *I think as the medic, the buck stops with you in terms of prescribing, what you are prescribing, why you are prescribing it and any guidance that you might give. For example, if I start somebody on a drug that has impaired renal function, then I have the responsibility to contact the GP and say, "please check this prescription after seven days." So I think there is that particular responsibility forced on the clinician* (D3p6).

Joan (Doctor 1) spoke of her professional and personal responsibility to do the right thing for a patient overriding everything else:

> *You are constantly trained to work very hard, to put your filters on and to get it right for the person, for the patient* (D1p14).

Jayne (Doctor 2) recounted how her approach to prescribing has changed with experience:

> *When I first started as an F1, I think that was at the level of, "oh my goodness, am I allowed to prescribe paracetamol? I actually have to sign this?" You have palpitations, then you become used to it and it becomes very second nature but with more*

> *experience I have come to recognise that is my responsibility again* (D2p6).

When asked about a doctor's responsibility, Caroline (Pharmacist 5) said:

> *I suppose doctors are responsible for prescribing and they are responsible for the overall care of that patient. The decisions they make, although we may prompt them to change things, they are still responsible for what they are prescribing. I think most of them are aware of that. They will challenge you if you have asked them something that they are maybe not sure about* (P5p7).

Jack (Doctor 7) commented on having to get to know what his role with medicines actually was:

> *That was something that was the hardest bit about starting back in August, knowing where the parameters of our role and our remit are. That has become clearer now but there are still grey areas, particularly more in the out-of-hours setting* (D7p3).

I asked Deirdre (Pharmacist 4) how a new doctor would know what his role was with medicines. She replied:

> *Surely is that not part of their training? Before they become F1 doctors, they go through the training programme and the pharmacists are involved in that training programme. They do various Direct Observational Clinical Practices; and that is to help keep the doctors safe and explain to them their role regarding medicines* (P4p15).

Participants spoke about new doctors starting work on wards every few months, having to learn what medicines are used routinely. The pharmacists and nurses were identified as being the static professionals on the ward who supported and sign-posted new medical staff and who mainly choreographed *managing risk*. This was often because their roles depended on having

accurate prescriptions and I will discuss this in Chapter 6 when outlining the strategies used for *managing risk.*

All participants highlighted the nurse's main medicines-related role as administering medicines. The nurses spoke about how they used this process in *managing risk*. One doctor's (Jayne Doctor 2) comment on the nurse's role was representative of what all medical staff said:

> *The nursing staff, they are the ones who are giving the medicines to the patient so they know what the patient is refusing or what they will actually take for you. They can guide you on the consistency of medication where they can say," well actually I gave them this tablet and they weren't really taking it. I think we should maybe switch to a liquid form." Even in that case it highlights that their swallow isn't as good as it used to be so I find that very helpful(D2*p3).

Doctors in particular recognised that nurses are good at safety checks, with Sally (Doctor 3) mentioning:

> *I have prescribed stuff and they [nurses] have said, "are you sure it's that drug?" (D3p4).*

Frank (Doctor 6) commented that nurses were the primary care providers and their knowledge of each patient helped to inform treatment choices.

Deirdre (Pharmacist 4) commented:

> *They [nurses] are very much involved with administration of medicines but again prescribing is important to them too. They need to make sure the doctor is prescribing correctly as well. It shouldn't just be the pharmacist's job. If nurses see errors in prescribing, they should identify them to the doctors and get them corrected and also make sure the patient understands why they are being prescribed a certain medicine and how to take the medicine* (P4p12).

There were also a number of references made, predominantly by nurses and pharmacists, to nurses acting as go-betweens and signposting doctors towards prescribing the right medicines.

Shirley (Nurse 2) highlighted the nurse's responsibility as making sure everything was right:

> *Allergies are the big one and dosage because obviously everyone can make mistakes. It is important for us to make sure we have it right but it is important to make sure it is documented right as well. Also making sure the timing is correct especially for critical medications, such as Parkinson's medication etcetera. It is our responsibility to make sure that our patient gets their medicines on time* (N2p7).

Patricia (Nurse 1) spoke of the nurse's responsibility in broader terms:

> *As a nurse, our responsibility is your duty of care to your patient and our Code that we follow. We also have a duty of care to the Trust as well that we work for and we have to respect and go through the guidelines and adhere to them* (N1p7).

Caroline (Pharmacist 5) commented on the inherent professional responsibility of nurses to satisfy themselves that a prescription is accurate:

> *Nurses are responsible for making sure the patient gets all the medication that they are prescribed. They do have responsibility for medicines safety, the same way everybody on the ward does I think. So even though it is prescribed, it could well be prescribed and even signed off from pharmacy and it is still their [the nurse's] responsibility, if they have a concern, to raise it* (P5p11).

Nurses spoke of the medicines administration round as a central and powerful process on the ward which needed time and focus. It is the process which is used to make sure patients get the right medicines on time, playing a big part in *managing risk*. The nurses interviewed commented that there

was a problem with medicines rounds being constantly interrupted either by others or if the nurse had to go and find a medicine to administer. The medicines round had a dual role because during the round, as well as administering medicines, the nurse also will check how each patient is feeling, for example, if they have any symptoms, what support they may need in taking their medicines and how much they know about their medicines. The nurse is asking herself questions about whether it is appropriate to give the drug and seeking clarification as needed.

The nurse must meet professional standards when administering medicines and participants spoke of nurses withholding a medicine until they checked out whether it was appropriate to administer it. Medicines administration is identified as a special and dedicated task that nurses need to be protected to carry out accurately. I have shown the specific roles of nurses relating to the medicines administration process as described by participants in Figure 6.

Figure 6: The specific roles of nurses on the medicines administration round

I initially found it challenging to identify what participants said the pharmacist's specific role was. This may partly have been because I am a pharmacist. The role was seen predominantly as checking prescriptions, ensuring medicines safety and filling in the gaps, either because prescriptions were incomplete or inaccurate or because additional input was needed to make sure a patient received the right drug. Pharmacists were also prescribers.

Introducing a clinical pharmacist to work on the ward was highlighted by all participants as being very important in *managing risk* associated with using medicines. Jack (Doctor 7) commented:

> *It does seem like the pharmacist checking through things like discharges, although it is not written in stone, it is just the fact that they are there: it is absolutely fundamental I think. There would be a lot more that could go wrong if they weren't there* (D7p6).

Pharmacists, in particular, seemed to delve deeper into a patient's medication history, their social circumstances and also why certain prescribing decisions had been made. They appeared to work from an initial position of not accepting things at face value, working things out from first principles as if each patient's care needed to be investigated and the correct solution found.

When defining the pharmacist's role with medicines, Shirley (Nurse 2) said:

> *Correctly identifying that the patient is on them, that there are no allergies, that their weight is appropriate for the dosage and then for discharge. The pharmacist would take a big role in discharge, ensuring they are going home on the right stuff, if they are on a blister pack [compliance aid] with changes, they would have organised that with the community pharmacist* (N2p10).

Deirdre (Pharmacist 4) described the pharmacist's role in a similar way:

> *Well, the main responsibility [of the pharmacist] is making sure that the patient is getting the right medication for the right reason and the way they do that is to get medicines reconciliation right on admission and have time during the patient's stay to check prescribing. Also, advising doctors on what could potentially be stopped and reviewed….so it is about raising awareness* (P4p11).

Angela (Pharmacist 3), a prescribing pharmacist, commented on how her role and level of responsibility had changed over time:

> [*From being] a [band] 6, it [my role] has definitely changed because now I am writing medication on discharge. I definitely review patients now more than what I would and I know the juniors [junior pharmacists] don't, as it is a lot about matching lists when you start out. So you have your ECR and you are just obsessed about matching a list whereas I think we need to move more towards, "is the list actually ok, it may match but do they need to be on it?" I don't think that is done enough but I would do that now when I am doing the medicines reconciliation. I will review and see if things are appropriate for the patient and then stop them if they're not. We are discussing with the medical staff, so it has changed a lot that way for me just as you gain experience and know what to look out for* (P3p6).

When asked how she prescribed in her practice, Angela added:

> *I mostly prescribe on admission when you are doing the medicines reconciliation and there are things missing or they are written up at the wrong dose or wrong frequency, I would change that at the start. Inpatient-wise, I would stop Sando Ks and things that are just left open with no stop dates I would look at. Discharge again, if you are changing, maybe stopping, their nebules or PRN things that they do not need but it would most*

> *heavily be at admission. So if you get it right then, there is not too much to change at discharge* (P3p5).

A number of participants had highlighted the benefits of pharmacists being able to prescribe and resolve prescription queries within the context of working as a member of the clinical team.

Caroline (Pharmacist 5) commented that the pharmacist's role was all about medicines safety:

> *I suppose medicines safety is our big thing. So we are day- to-day reviewing Kardexes and making sure when there is an admission that there is medicines reconciliation. So that's tallying up what they were on before they came in and that sort of thing* (P5p3).

Caroline spoke of how the pharmacist highlighted concerns to the medical team, often after prescribing decisions had already been made:

> *We are just highlighting things to the medical team and saying, "have you thought about the potential that this might be a problem?" So it is things like that* (P5p5).

The pharmacist's important role in *managing risk* at the point of discharge, making sure a patient's discharge prescription is accurate and dispensed in a timely way, was mentioned by the majority of participants. Karen (Pharmacist 2) described a multi-faceted role:

> *Optimising treatments for patients going home and then doing the nitty gritty of the discharge letter and the interface between hospital and primary care - needing to speak to community pharmacists, GPs, carers and nursing homes* (P2p7).

This is an example of the problem-solving role of the pharmacist, filling in the gaps and helping the system to flow and move forward. Karen went on to comment on the pharmacist's wider role of counselling patients on how to take their medicines. This contributed to *managing risk* but was not measured in terms of work-load statistics:

> *The measureable things are the interventions that we do, in terms of stopping and starting medicines, and that's what you keep your statistics for. Whereas sometimes we lose track about this other [counselling] role that with the knowledge we have, that we can bring to people and we almost take it as common sense but it's not common sense. It is only common sense to us because that is what we do* (P2p10).

When asked if the pharmacist's role was what they had expected it to be, Mary (Doctor 5) said that she thought that pharmacists would be dispensing in the pharmacy as opposed to checking Kardexes at ward level. She described the pharmacist's role as counselling the patient (a role which doctors also had) and:

> *Very much checking up on us to make sure we are doing the right thing* (D5p15).

Sally (Doctor 3) spoke of the wide and all-seeing role of the pharmacist enthusiastically:

> *They are great at coming in and knowing what is missing, what should be done or what needs adjusted for the GFR and things like that. I think pharmacists have some compendium, some magical database that we cannot see. They are absolutely fantastic at discharge planning. The F1 will do the letter, they [pharmacists] will go over the drugs and check every single drug and highlight anything that has been left out and we notice a difference when they are not here, in terms of getting our patients' drugs up in a timely fashion. It is just chaos when they are not here. So I think the role of the pharmacist has really changed. It makes a massive difference having them based on the wards and linked in as part of a team* (D3p4).

Some doctors and pharmacists suggested that the pharmacist should be present routinely when the patient is admitted, to ensure the medicines are right at that stage. Often pharmacists would come along up to 24 hours later and retrospectively correct prescriptions whereas a better and safer approach would have been to carry out the medicines reconciliation and prescribe drugs in real time. Angela (Pharmacist 3) highlighted this:

> *It would probably be ideal if a pharmacist was there at the start to write up all the medicines and then that way you would get rid of that risk with the medical staff prescribing. Then they [doctors] might be deskilled if they aren't prescribing anything on the Kardex* (P3p5).

When comparing the responsibilities of all three professionals, Shirley (Nurse 2) commented within the context of how mistakes were often made on the first day when a patient was admitted to hospital:

> *Well, the doctor's [responsible] because they prescribed it, they are in the wrong as such. It is our [nurses'] responsibility to recognise when things would be wrong and then our pharmacists would be the ones that would correct it then* (N2p8).

Angela (Pharmacist 3) listed the medicines-related roles of all three professionals:

> *Nurses' would be administration. Doctors', well they have to be able to prescribe it properly to begin with. The pharmacists are really checking and changing when things go wrong* (P3p5).

Karen (Pharmacist 2) commented on roles being blurred now with a development to other professionals listening to and acting on the advice of the pharmacist, thereby recognising the pharmacist's role with medicines:

> *I think the roles with medicines are all quite blurred now, in that we have such a team approach that for instance, if you [the*

> *pharmacist] have any input about medication, they [doctors] are right open to hearing about it and if I said even to a staff grade, "that's not what we normally do", they would change that. So I think the professions are recognising the [pharmacists'] expertise and doctors have given, maybe they haven't held on to, control of medicines* (P2p17).

When *managing risk*, each professional group appeared to adopt a different approach.

Polly (Pharmacist 0) spoke about everyone who worked in healthcare wanting patients to have the medicine which is right for them, given at the right time. She went on to say that doctors, nurses and pharmacists each brought something unique to the use of medicines from their professional approach:

> *Each comes with the part that their own profession kind of brings, medical staff more in relation to prescribing, nurses more in relation to administration and pharmacists, while looking out clinically, will also have a supply head on because they can never get away from that and will also have a medicines information view as well – is it appropriate? Pharmacists will ask, "can we actually get it?"!* (P0p4).

She went on to describe how each different professional group had different needs and focus with respect to working with medicines:

> *Medical staff will want much more of the evidence around that decision, to be making an informed decision, whereas nursing staff will also want that to some extent but will also have a view, "that's what's being prescribed, that's what I am being directed to give, I need to just know is that safe to give?" As a nurse,…. I am more concerned about what it is going to mean for the patient. If I have a patient in front of me and they are asking, "how is it going to make me feel?", they [nurses] are going to have to answer that question so that is probably the*

kind of information that they need. Or if they are discharging the patient home – "are we going to have any issues to sort out for district nursing?" I see it as there is a common ground – like a Venn diagram – the circles are the three professionals with the patient in the middle – each brings their own slant to it (P0p5).

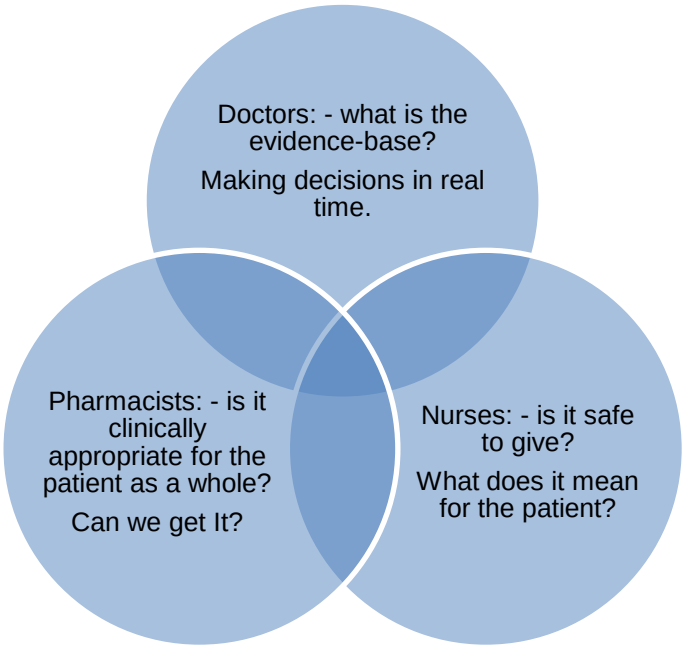


Figure 7: Venn diagram – the questions which doctors, nurses and pharmacists ask when using medicines.

The questions shown in the Venn diagram in Figure 7 were also raised by other participants.

Polly added:

> *When you [pharmacists] see that whole picture of the patient coming in [to hospital], these are the medicines they are on, are there any they should be on? You [pharmacists] do bring different skills to that situation …., in discussions you are aware that you bring something different to the situation and it is hard to put your finger on it* (P0p6).

The more experienced pharmacists and nurses spoke about working in line with their professional Codes of Practice. In listening to these individuals in particular, they explained that their professions looked at medicines

differently to especially medical staff. Patricia (Nurse 1) highlighted the nurse's view:

> *We take a holistic approach to patient care* (N1p3).

Karen (Pharmacist 2) reflected on how a physiotherapist who was a new prescriber used medicines:

> *They [physiotherapists] use medicines differently and I don't know if that is because physio is more practical. So they are using medicines to generate sputum and correct breathlessness, more a means to an end, I suppose, to allow them to do their job properly; whereas medicines are our [pharmacists'] job, maybe? The physio is very different as they are very practical but wanting to use medication then to help his role. Whereas I think for us [pharmacists], we are all about medicines* (P2p9).

From both of these quotations and comments from other participants, it felt as if pharmacists and nurses thought more widely and fully about all the factors needed to use medicines safely.

Doctors and pharmacists in particular, spoke of making decisions by assessing the relative risk of the tasks which they had to carry out.

Polly (Pharmacist 0) summed up the pharmacist's approach in saying:

> *Pharmacists are more risk- aware. This develops early on in their professional life. They have the foresight not to take things at face value. They manage on a day- and-daily basis, continually looking out for risk, mitigating against it and trying to prevent it* (P0p4).

This was reinforced by Caroline (Pharmacist 5), who explained how she liked having a second pharmacist on the ward-based team to check with because they adopted the same process of solving problems as she did:

> *It's not necessarily from a safety point of view, but pharmacists can be quite black and white, so what are the rules on this, where are the guidelines? And the doctors will sometimes make decisions and it is a clinical decision based on the patient they have in front of them. It [the clinical decision] might not necessarily 100% follow what the BNF says or what the guideline says but that guideline maybe doesn't suit the patient they have in front of them. It is good to have another pharmacist there to say, "this is sort of off- guideline, but do you think it is ok, do you think it is still safe?" … and we can rationalise why maybe the doctors haven't gone with just the guideline information* (P5p20).

Medical staff made complex decisions by taking all of the information about the patient on-board and looking at the evidence-base. Polly (Pharmacist 0) commented that right from a very early stage, doctors very quickly have to become used to being on the spot, being asked questions and having to justify their decisions. She saw a difference between the approach and confidence of student doctors, nurses and pharmacists:

> *Nursing students, maybe because of their time on [clinical] placements, they do seem willing to speak up when they see something not right. I see this when we do inter-professional educational sessions with nursing, pharmacy and medical students in their final year. You do see the confidence more with the medical and nursing students- it has improved with pharmacy but it's taking a while. They have less clinical exposure* (P0p12).

So differences are seen between the different professions from an early stage. This may be due to a variety of reasons including the training methods used and the level of clinical exposure during training.

When *managing risk*, doctors spoke of integrating medicines review into the daily patient review, making decisions in the here and now and moving on to the next of maybe fifty patients that they had to see that day. Nurses and

pharmacists spoke about filling the gaps, querying prescriptions, especially at discharge and sorting out the implications and impact of doctors' prescribing decisions.

Fred (Doctor 4) highlighted the difference between nurses and doctors' ways of doing things which they didn't know much about. Nurses were cautious about doing something that they have a problem with, making a note to cover their backs which they believed was appropriate. On the other hand, he said that junior doctors were:

> *Putting our name to very many drugs that maybe we don't know much about and we are just putting them [the patient] on because the previous Kardex has but it does have implications down the road potentially if something does go wrong, for example, if there is an allergy* (D4p23).

5.4.3 Summary

Managing risk is central to how doctors, nurses and pharmacists work with medicines in acute hospital wards. I have extrapolated some of the reasons why a risk management approach is adopted and outlined the roles and responsibilities of doctors, nurses and pharmacists in managing the risk associated with medicines. I have also discussed the different approaches taken by each professional group when *managing risk*. Focusing on the work of three different professional groups has helped to address the aim of the study.

Patient safety was highlighted by all participants as being central to the way they worked. In ensuring patient safety, each participant adopted a range of risk management strategies, depending on their profession, their role and level of experience and seniority. I will go on to define the different strategies used and the consequences of *managing risk* in Chapter 6.

6.0 Laying out the theory - strategies and consequences

6.1 Introduction

In Chapter 5, I described the condition *working with the complex and the routine* that leads up to the core category *managing risk*. Strauss and Corbin mentioned that, "our concern, as analysts is…with conditions of various types and the way in which they crisscross to create events leading to actions/interactions (strategies)" (1998:133).

Two main (action) strategies emerged from the data and they are integrated into the theory as outlined in Figure 5. They are:

- Using checks and balances.
- Working together.

In this chapter, I will lay out the data in relation to these strategies, as well as the data in relation to the consequence, *ensuring each patient gets the right medicines.*

6.2 Using checks and balances (strategy)

6.2.1 Introduction

The term *using checks and balances* was an early *in vivo* code and I had identified it as the core category at one stage of the analysis.

It relates to:

- Each professional's personal, internal *checks and balances* when using medicines.
- The *checks and balances* built into the whole system of using medicines.

Using checks and balances became a rich strategy into which a number of earlier sub-strategies have been integrated as a result of ongoing analyses. These sub-strategies were:- reviewing prescriptions regularly, making good decisions, checking information with patients and carers, structuring each day's work, prioritising tasks, being able to access information, making the best use of time, introducing new ways of working and developing new roles. All of these sub-strategies were used by individuals as well as being part of the system of using medicines. Such integration is central to the development of a robust grounded theory (Strauss and Corbin 1998).

6.2.2 Personal checks and balances

Each participant made reference to checking as part of their day-to-day practice with medicines. These checks took on different forms, for example, checking stock levels of medicines, checking a patient's allergies, checking with a colleague and also checking their own work. Checking was particularly central to the role of the pharmacist and the nurse.

Participants' individual approaches to using medicines included making risk-based judgements in their work - the balances. This was specifically spoken about by doctors and pharmacists. FY1 doctors worked mainly within their personal limits when prescribing. They took, "safe short-cuts" (D7p7). More senior doctors helped patients to balance risk with choice of medicine (Doctor 6). Pharmacists balanced their time when prioritising, "the top thing" to be done (P3p4).

Each person interviewed mentioned using their own personal checks and balances within the context of understanding that medicines errors could have serious consequences, making sure that they did a good job and *ensuring each patient gets the right medicines*. It was clear that checks may not have been carried out on every occasion that they could have been and that balances were not effective each and every time, leading sometimes to medication errors. Professionals' insight into this lack of consistency drove their use of *checks and balances.*

The doctors spoke mainly about how they prescribed. The middle grade and senior doctors spoke of being thoughtful about their prescribing and taking care with the decisions they made.

They mentioned having, “in-built alarms” and being guided by nurses, pharmacists and other medical staff when making prescribing decisions. Jayne (Doctor 2) commented:

> *Something triggering in your mind like," I have to check about this one, there is something, I have to be careful. I'm not sure what it interacts with or what I need to be careful of but I need to look it up". Things like that where you have signposts in your head, where you think," ok, you may not know exactly what it is that's wrong about this but you need to check*" (D2p2).

Different levels of doctors explained ways of *using checks and balances* when making decisions. FY1 doctors prescribed a limited number of medicines which had usually been prescribed before. They tried to make a risk-based judgement that the medicine was low-risk and within their competency to prescribe, for example, a laxative. More senior doctors spoke about using mechanisms to make decisions about more complex medicines, for example, discussing treatment options at a regional multidisciplinary team. They talked about understanding guidelines, either from first principles or in the context of a particular patient, and being able to make well-informed decisions using this information, taking a balanced approach. They spoke about how they learnt from all the members of the multi-professional team. They involved patients in their decision- making, often asking what drug had worked well for them in the past.

Jayne (Doctor 2) spoke of how she checked before she prescribed a medicine:

> *At a basic level, we are responsible for prescribing medicines, so we have to be extremely careful with what you are writing down. It can be very monotonous; it is something you do without thinking, for example, prescribing paracetamol. But with*

> *more experience of working as a doctor, I found that you need to really engage your brain when you are thinking about medicines because these are the things that are going to kill people. Anything is toxic in a high enough dose. So I have come to learn that you have to check the BNF if you are not sure or ask your friendly neighbourhood pharmacist if you have any questions (D2p1).*

Mary (Doctor 5) talked through the *checks and balances* which she uses when prescribing a medicine which she is not very familiar with. These included looking to see if it has been prescribed before, prescribing what her senior has told her to prescribe, checking if the patient has had it before and looking to see if a pharmacist has checked the prescription. Having each of those things would support her in prescribing the medicine. She spoke of having a line over which she does not cross, insisting that a senior colleague signs a prescription for a high risk drug:

> *It is not something I would do without consulting someone. If I wasn't sure and there were no obvious guidelines and the pharmacist wasn't around, I would discuss with the SHO or above to clarify first of all why they need it and then obviously the correct dosage. I wouldn't jump into something to be honest if I didn't know what I was prescribing* (D5p11).

Frank (Doctor 6) set aside time away from the busy ward to prescribe complex therapies. He recognised that this was a higher-risk task and he altered his personal approach to manage that risk.

The nurses interviewed had a different practice to the doctors when *using checks and balances*. They were the only profession which integrated the use of safety checklists such as the Five Rights (Smetzer 2007) and the, "more than three" rule (no reference) into their practice. Shirley (Nurse 2) spoke about this:

> *Yes, well we will have the name and the dosage of the medicine and then from knowledge you should know that doesn't look right and then you would query it. You were always taught a maximum of three, anything over three and you question it. So we would always know if something was 5mg and they came in 2.5mg tablets, then two tablets of that is okay. But if you were giving any more than three then other than steroids, you would question that* (N2p5).

Nurses also spoke about checking that a prescription was accurate before administering a medicine, knowing their medicines, seeking advice if they were unsure and checking a patient's details.

The pharmacists identified using structured checking processes as well, including medicines reconciliation when patients crossed interfaces between wards and between primary and secondary care. Angela (Pharmacist 3) spoke of making decisions and not having time to check with a patient that they are the best decisions:

> *Sometimes making decisions and just going with it because there is just no time to do it any other way* (P3p17).

Lack of time was mentioned especially by doctors and pharmacists as something which forced them to make balanced, risk- assessed decisions.

6.2.3 System-related checks and balances

As well as highlighting their own personal checks and balances, each participant made reference to *using checks and balances* in the system which they worked in. Some described formal processes such as audit and incident reporting. Structured working practices such as ward rounds also supported participants in carrying out tasks. Participants also assessed the relative risk of medicines-related tasks. . The presence of individual, experienced practitioners such as the nurse or pharmacist on the ward was

also mentioned as being a less formal *check and balance* in the system. These are all described more fully below.

Most of the medical staff described auditing the use of medicines, for example, carrying out antimicrobial or pill-burden audits. These experiences seemed to influence their subsequent prescribing practice. Jayne (Doctor 2) had mentioned how carrying out medicines audits had made her a more thoughtful prescriber:

> *In the last year I took part in an antimicrobial audit and from that I have been a lot more careful about the antibiotics that I am prescribing and patients I have looked after with C diff – it really focuses your mind and you think," do they actually need to be on this antibiotic or are they on the correct antibiotic, can we focus it down*?"(D2p2).

She gave a recent example of reviewing an antibiotic prescription and how she felt the system in her current ward had not been effective:

> *I looked at a patient's chart. They actually had what looked like an AKI so I looked through their Kardex and they were on trimethoprim for a UTI and whoever had written it had quite rightly written,"3 days" but then it had just been continued on. So we were on day 6 by the time I caught it. And I wondered what the relationship was between the nurses and the doctors in this hospital as in the previous hospital, particularly with us doing that audit, it empowered everybody to question whether a patient needed to be on an antibiotic* (D2p2).

So formally auditing practice not only raised awareness but gave permission to nurses and doctors to ask challenging questions. This example also underlines the importance of questioning what is happening and professionals working together in *using checks and balances*.

When patients did not get the right medicines, some participants highlighted errors relating to medicines being reported through Trust incident reporting systems and that there was learning from this. Shirley (Nurse 2) said:

> *It would be learning from mistakes and learning from what we have already been told. One big one here would be the IV paracetamol and the weight restrictions. So we would make sure all our patients are weighed when they come in where possible* (N2p4).

When *working with the complex and the routine*, nurses and pharmacists in particular described structuring the way that they worked to manage risk. They spoke of approaching each day's work with medicines in a specific way. Jackie (Nurse 3) structured her day around the medicines round. When asked how medicines fitted into all the other work that happens on the ward she said:

> *We would start our day out with the medicines and that would be the first. After you have them [patients] sitting up for their breakfast, we do our medicines first to make sure that they were comfortable and we can find out if there is anything else they need. It is a good way, when you are doing the medicines, to see if they feel sore or in pain etcetera* (N3p4).

Karen (Pharmacist 2) explained how she worked at ward level:

> *The first time the consultant sees them [newly admitted patients], they [the consultant] will do a post- take ward round and they will put a plan for what they think is wrong with the patient and what their plan would be. So I would go back to that once I've done the medicines reconciliation to check that we have implemented that plan and that it is appropriate for that patient, based on all the other factors that you would take into consideration. So you would make sure that the Kardex is right and they are being prescribed everything and that it is the correct dose and the correct route and all those other things that pharmacists think about*! (P2p5).

Rebecca was able to solve problems in a structured way on the multidisciplinary ward round because all the resources she needed were there:

> *We have started going on the ward rounds in the mornings which is great and then we go to the 11 o'clock discharge meeting with the consultant; so on that round it is very, very good, for you are highlighting problems and you are actually able to solve the problem when you are there because you have two medics, nursing staff and you have the patient in front of you, so that's stopping the problem going any further. So I find that very, very beneficial* (P1p4).

She compared this to working in areas where she didn't attend the ward round:

> *Certainly on the other wards where you don't do a ward round, you can really see the difference, in that everything comes at once in a big cluster and everybody, the nursing staff, can get quite flustered at times because there is so much work. Whereas, if you had the ward round in the morning and you are prioritising your workload as you go along, seeing the patients, seeing what needs done, it is much easier. I believe it is much safer doing it that way* (P1p5).

There were a number of other systems which provided checks and balances.

Mary (Doctor 5) sought local prescribing advice when she started working on a new ward, wanting to know the common prescribing tips which were particular to that area of practice:

> *I ask just for wee hints of different things and different adaptations to medications maybe compared to what you would have done beforehand* (D5p12).

Fred (Doctor 4) heard nurses confirming each patient's name and date of birth when administering medicines. He believed that this was an obvious thing to do but was surprised that it continued as when you are present every day, you know who the patient is. He finished his point by saying:

> *The first time it happened, we had just been with the lady on the ward round and prescribed it and I thought it almost seems a bit unnecessary but if it happens every time it really does stop the wrong person getting the wrong medications* (D4p12).

Shirley (Nurse 2) had said that everybody looked out for each other. I asked her if double checking systems were effective. She said that they were not always effective as sometimes staff can take their eye off the ball or lose concentration:

> *If you get lackadaisical or if you get familiar, it can be just a case of you are glancing. You need to remind yourself at times to really sit down and do the 1-2-3-4 different stages to ensure that it is correct because people can get very lackadaisical in checking and double checking* (N2p15).

Deirdre (Pharmacist 4) spoke about providing written checklists to help doctors and nurses on wards which were not visited by a pharmacist to streamline medicines requests:

> *What we have done is provided a guidance, directions on what to do before sending the script to pharmacy, like a checklist, and that has helped. Wards without clinical [pharmacist] cover were cross because scripts were back and forwards trying to get them fixed up. So we have tried to guide them on how to make sure, streamline it and go through the checklist so that the script isn't delayed unnecessarily* (P4p10).

Deirdre also described changing the template of prescriptions to help direct doctors to write controlled drug prescriptions in line with legal requirements.

Checks and balances are designed into the hospital medicines management system by all healthcare professionals also by taking a risk-assessed approach to carrying out specific tasks. Doctors stratified the risks associated with prescribing by allocating appropriate levels of prescribing to different grades of doctors to allow them to learn on the job within a relative risk-assessed framework. Each doctor spoke about their prescribing role and that of other doctors. In analysing this data, it appeared that the doctors in my study carried out levels of prescribing tasks allocated as part of a conscious or subconscious practice framework in operation within Trusts. I integrated the different levels of prescribing tasks, with the associated practice outlined by participants, as well as participants' descriptions of what they thought about prescribing at their current level, into Table 22. This table allowed me to delineate a prescribing process spoken about by participants in my study which contributed to my understanding and analysis of how they thought about prescribing. All of the doctors mentioned how their approach to reviewing prescriptions changed with experience.

Table 22: A developing process of making prescribing decisions throughout a doctor's hospital career

Stage in Career	**Level of prescribing**	**Approach**	**Participants' descriptors**
Foundation Year 1 (FY1)	Basic prescribing – symptom control.	Seeking others' advice.	
	Transcribing / re-writing Kardexes.	Relying on others knowledge.	
	Prescribing what you are told.	Asking, "what would you do?"	Spend more time in the specialty. What about the art of prescribing?

Foundation Year 2 (FY2) / CT4)	Prescribing drugs on admission.	You know the basics.	What about involving the patient in prescribing decisions? Driving a car analogy. Gut feeling. Unconscious competence. Engaging your brain. Can be mundane. Teaching others to focus on medicines.
	Using guidelines.	Confident in doing the general run of the mill stuff.	
	Seeing prescribing in the wider context of the whole patient.		
	Starting to de-prescribe.		
Specialty Registrar, Staff Grade	Making complex decision, sometimes in the absence of evidence.	Trying to back up complex decisions – going back to first principles, literature Multidisciplinary Team (MDT) structure.	
	Taking an informed pragmatic approach.	Local MDT.	
	Weighing up the potential risks.	Regional MDT – all treatment decisions taken through that.	
	“Guidelines are just guidelines.”	Writing local and regional guidelines.	
	Choosing particular drugs based on experience of using them in the past.		

I checked the content of this table through discussion with subsequent medical participants. It appeared that this “framework” had not been made explicit to the other healthcare professionals involved in using medicines or initially to junior doctors.

In surgery, a different approach was taken, with the FY1 prescribing the drugs on admission. When asked why, Mary (Doctor 5) thought:

> *It is just because the patients come in well to us so they [the Consultants] are happy for us [the FY1] to clerk them in whereas in medicine not so much* (D5p5).

So prescribing in surgery possibly is seen as a task of lower risk compared to carrying out the surgery. Also, fewer changes are made to medicines during a patient’s stay on a surgical ward.

Each professional group outlined how their approach to reviewing prescriptions and using medicines changed as they gained experience. This particularly seemed to be the case with the doctors interviewed.

Jayne (Doctor 2) said that her prescribing changed with experience:

> *I was chatting to some friends and we all agreed that in the beginning you knew very little and then with experience on the job you felt like, “I know a wee bit, this is good. I feel like I am getting on well.” Then in second year you think, “I know everything now, I am great. I understand everything, I understand the physiology of everything - there is nothing more I can learn.” Then as you get further on and you gain more experience, you suddenly think, “oh my goodness, I know absolutely nothing, but you knew more than you knew the year before.” So the more you know, the more you realise you don’t know (D2p7).*

When asked if the way he made decisions had changed during his career, Frank (Doctor 6) said that it had as circumstances changed and as his responsibility had increased.

When asked if the way she used medicines had changed with experience, Shirley (Nurse 2) replied:

> *The principles are all the same, your checks are all the same but confidence comes a lot easier the longer you've been working with them (N2p6).*

She went on to describe having a gut feeling:

> *For example, IV antibiotics etcetera, if you don't think they [the patient] should be on that or they have a penicillin allergy and it is something that you are not 100% sure if there is penicillin in it or not, then go and check it out. There has been the odd time where it has been missed* (N2p6).

Having a gut feeling was also commented on by medical staff as part of their checks and balances.

Jackie (Nurse 3) talked about the pharmacist's routine role in medicines reconciliation, which had been mentioned by pharmacists in particular as an important check in the system:

> *They [pharmacists] will do it [medicines reconciliation] the next morning and they will update us [nurses] on what medicines need altered, if they need doses changed so that we can let the doctors know* (N3p8).

Using nurses as a go-between was not practice on the ward where Angela (Pharmacist 3) worked. She described needing to move from simply reconciling to fully reviewing medicines:

> *Whereas I think we [pharmacists] need to move more towards, "is the list [of medicines] actually okay? It might match [the list*

of medicines on admission] but do they need to be on it?" I don't think that is done enough but I would do that now when I am doing the medication reconciliation. I will review and see if things are appropriate for the patient and then stop them if they're not. We are discussing with the medical staff so it has changed a lot that way for me just as you gain experience and know what to look out for (P3p7).

Jackie (Nurse 3) described the checks and balances which she saw doctors using when prescribing for new patients:

I suppose they would be looking at the ECR as well and checking off their list as that is their main base for finding out. Sometimes they will go and ask the families because the families know best what they've been getting and they will work closely with the pharmacists to see if there is anything missing from the Kardexes (N3p8).

Participants (doctors, nurses and pharmacists) referenced the benefits of having higher banded staff available routinely at ward level to answer questions, act as role models and provide support. They also spoke of the benefits of having a fixed pharmacist with specialist knowledge based on a ward with respect to continuity, establishing relationships with clinical staff, understanding consultants' preferences, being part of an established team which seems to work seamlessly together (have each other's back) and being able to operate at a particular level of practice.

Rebecca (Pharmacist 1) commented:

The consultants do find it quite hard us [pharmacists] being rotational – having three new faces every six months. That is very hard for medical staff because they learn to trust that person. They learn to know they can go to somebody they know with this - I could ask them this. They know that if they go to Medicines Information they will get back to me, or no I don't know this person, I don't think I could ask them so I'll just have

> *to do this after. Then the patient's care suffers because the answer isn't got as quickly, the medicines aren't changed as quickly so the patient isn't priority number one* (P1p14).

Angela (Pharmacist 3) also highlighted concerns about junior pharmacists rotating through clinical areas too quickly, not helping them to consolidate their knowledge. Both Rebecca and Angela however understood the importance of training new pharmacists in each clinical area and this way of working mirrored how junior doctors were trained. Pharmacists in a different hospital had a multi-layered approach with a more senior and more junior pharmacist on the ward. This provided service continuity as well as a role-model.

The nurse seemed to be the glue on an acute ward, the steady presence - doing the medicines round and knowing all the patients, their symptoms today, what social support they have and whether they can take their medicines. They were spoken of by everyone as being the go-to person for the other healthcare professionals and they provided input on choice of drug based on their wider knowledge of patients. All of the doctors realised that nurses highlighted things which doctors may not perceive, such as a patient being drowsier than the doctor thought or having problems with swallowing. In addition to this, Sally (Doctor 3) defined the nursing role in *using checks and balances:*

> *The nurses are very, very good and even analgesia and additional analgesia but also safety checks. So I have prescribed stuff and they said, "no actually, I think that's the wrong spelling or are you sure it's that drug?" So they play a key role* (D3p4).

Nurses linked with the pharmacy team regarding medicines availability and checked when something did not look right.

Reviewing medicines regularly was mentioned as being an important action (in relation to *using checks and balances*) by all participants. The term could easily be confused with medicines (or medication) review (NICE 2016) and

so, in order to capture its multi-professional nature, I have used the term, reviewing prescriptions regularly.

For doctors, this was usually carried out as part of a wider review of the patient and was mostly the role of a more senior doctor. However as junior doctors (FY1s) described being asked to write and re-write prescriptions as well, I have used the term to cover reviewing all prescribing, including nurse and pharmacist prescribing.

Sally (Doctor 3) spoke of how she made prescribing decisions:

> *When reviewing patients, looking at what they are on, is it relevant, is it needed and how do I modify it in tune with their observations or their wellbeing that day? Sometimes on the ward it would involve assisting F1s if there are patients unable to swallow, whether there are alternatives or if the patients are having seizures and their magnesium is low, how do we convert the oral medication to IV medication?* (D3p2).

This description was similar to that given by other senior doctors. Jayne (Doctor 2) commented:

> *As I've gotten more experience, I feel more confident, for example, if patients are reaching the end of life, taking the bull by the horns and thinking, "right, do they need to be on their statin? Is it going to be prolonging their life? No they are going to be passing away soon so take that off." Whereas in the past I wouldn't have felt that it was up to me to do that. I would've felt that was too big a job* (D2p8).

Nurses reviewed prescriptions each time they administered a medicine or discussed medicines with patients. Pharmacists reviewed prescriptions each day, having a particular focus on reconciling medicines on admission and when helping to prepare the discharge prescription. This involved checking for accuracy and appropriateness as well as filling in any gaps in a prescription. This was carried out either by a pharmacist prescriber or by asking a junior doctor to make changes to the prescription.

Nurses and pharmacists also spoke about taking wider information into consideration when making decisions about a patient's medicines. This was an additional *check and balance* in their practice, grounding decisions within a wider continuum of patient care. Some spoke about this with zeal. When asked what influenced the way she worked with medicines, Patricia (Nurse 1) mentioned evidence and clinical guidelines but also everything around the patient:

> *Again if not 100% sure, I will ask the multidisciplinary aspect of it, to see is it going to suit the patient? Is it going to suit with the relatives? Is there going to have to be District Nursing involved? Is there going to have to be other disciplines pulled in to help? Whatever is going to help the patient with the best outcomes; say for us it is to reduce HbA1c, but that is not always the goal. We have to have a quality of life as well as what we are recommending. It is a holistic assessment that I would use* (N1p3).

When asked how her approach to prescribing differed to that of other professionals, Karen (Pharmacist 2) outlined:

> *I think as pharmacists we probably, maybe this is not fair but, we think about the whole patient, not just think this is what's wrong with that person, this is what we need to treat it…maybe we see what else they are on as well whereas I think they [doctors] don't. They tend to just see one condition and prescribe for it* (P2p5).

Participants from each professional group highlighted the importance of paying attention to the detail when reviewing prescriptions. They looked at the implications of prescribing each drug for individual patients.

Fred (Doctor 4) highlighted the value of having a plan in place for medicines before the patient is discharged. This would help to inform the FY1 about what to prescribe when writing the discharge letter. Sally (Doctor 3) taught junior doctors about the importance of reviewing prescriptions each day.

Cathy (Nurse 4), talked about the importance of nurses paying attention to detail:

> *It is our responsibility to ensure we are giving the right medication, the right dose by the right route and that the prescription is right. That we are not just scanning it over either and just giving the drug, that everything in that prescription box is correct and anything that is not correct then we need to be flagging it up* (N4p6).

A further systemic *check and balance* used by all participants was being able to access and use accurate information. This was particularly important when *working with the complex and the routine.* Throughout the interviews, participants frequently talked about looking for information, seeking clarification, signposting others and asking for advice when reviewing prescriptions. When doing this, they used a range of information sources to help them to review prescriptions when they were prescribing, administering or checking them. These included asking patients and carers, using guidelines, other texts and training as well as asking professional colleagues. I have given examples of how participants used each of these three sources below.

All healthcare professionals spoke about asking patients about the medicines they were taking as an additional *check and balance* when prescribing or administering medicines. They also commented on many hospitalised patients being older, often with dementia, and not being able to discuss their medicines. In such situations, a family member or carer would be approached.

Jackie (Nurse 3) said:

> *The patient, they are the centre of it. So sometimes we would get families up and they know inside out what their relative takes and sometimes the patient does themselves, just depending on their background and what they are like. They know everything about their tablets…sometimes patients stop*

> *taking medicines and it is not changed on ECR because obviously the GP doesn't know because they [patients] change it themselves* (N3p16).

Mary (Doctor 5) was permitted to clerk-in patients in surgery but not in medicine. She saw the advantage of doing this when it came to prescribing medicines:

> *It is nice in surgery then to actually confirm with the patients and go through the list of medications so that you know that you are signing something that is actually correct, rather than signing something that someone else has deemed to be correct* (D5p6).

A number of more experienced doctors said that sometimes they would ask patients what had worked well for them in the past before prescribing a drug. Jayne (Doctor 2) commented:

> *Then if they've had an allergy and it is on their ECR but then the patient says they've never had an allergy to penicillin and they've had Tazocin in the past. So generally talking to the patients themselves and asking what sorts of things have happened them in the past with medication; is there anything that they actively avoid and why and what happened to them?* (D2p4).

A further *check and balance* was each professional keeping their personal knowledge of medicines up-to-date by learning on-the-job, using formal or informal mechanisms. All participants talked about constantly learning on-the-job and learning from errors. In this way they were continually *managing risk*. They acknowledged getting their base-line learning when they were undergraduates. Pharmacists in particular referenced participating in formal postgraduate study (which had a practice-focus) as being of great value.

Nurses mentioned reading patient information leaflets in medication boxes (package inserts), the BNF or having ward-based teaching sessions from pharmacists. Shirley (Nurse 2) said:

> *As a student, you were encouraged to read up on them [medicines], between the leaflets in the boxes and your BNF. The more you work with them, the more knowledge you gain and again we have a good relationship with the pharmacist that we will ask what this is for* (N2p5).

Karen (Pharmacist 2) highlighted that there was a lot expected of nurses when it came to medicines and commented on how nurses learned in comparison to pharmacists:

> *I don't know that, certainly initially, that they [nurses] have the training; it probably comes only with experience. I don't know that when they do ward rounds, medicines rounds by themselves, they never get the opportunity to see how somebody else works. We tend to as pharmacists, at some stage, get to work alongside other people, whereas they [(nurses]) are very much, "you're a qualified nurse, go and do it now." I do empathise with them and you see them struggling* (P2p14).

Caroline (Pharmacist 5) described the benefit to her practice of enrolling on formal, practice-based, postgraduate courses which had content which related to what she would do on a day-to-day basis as a pharmacist on the ward. She also described learning from how other pharmacy colleagues practised:

> *When I started here I was just shadowing other pharmacists and it was brilliant, just for even, again it is not necessarily the clinical things, but just practically is that how you would approach that and it just helps to see different ways of working……you can pick the best bits from everybody's ways of doing things* (P5p19).

Nearly all participants used guidelines to different extents as a check in their practice. Guidelines seemed to be central to the approach of middle grade medical staff:

Jayne said:

> *I think my own personal experience comes into play as well but I am very guideline- driven. I think I am a bit OCD about guidelines and I get frustrated when I can't find them* (D2p4).

Sally (Doctor 3) spoke about what influenced her prescribing:

> *I think it is a combination of things. There are the obvious facts and the guidelines but I think part of being a good doctor is being able to personalise the drugs to the patient, for example, statins if you are a diabetic, 88 year old patient who cannot swallow. So I think there is a bit of common sense and guidelines are for guidance* (D3p3).

Joan (Doctor 1) described her prescribing practice in hospital outpatient clinics. She said that she uses a lot of guidelines when making decisions:

> *Partly that is appraisal- driven and partly that you are just trying to see where everything fits* (D1p4).

Later, however, Joan spoke of preferring to learn from attending training sessions as opposed to using guidelines:

> *You can choose the things you are worried about and go to the lectures on it and find out what people are doing and talk to them. The guidelines are fair enough but they are always so outdated by the time they print them, something new could have happened and that's not even in it. So guidelines are probably the weakest one* (D1p13).

Frank (Doctor 6) described going back to first principles to read the original research on the use of a medicine or the treatment of a disease to help in the design of local drug protocols. Having this deeper knowledge helped him to make better decisions when faced with a complex problem and to be able to justify a decision he would be responsible for.

Nursing staff in particular described following guidelines and standards quite rigidly. Patricia's (Nurse 1) prescribing practice involved working within guidelines, with off - label or non-routine prescribing being the territory of experienced consultants:

> *Just by means of assessment, obviously we have our rules and regulations and our guidelines and what we can do. If it is above me, for instance if it is some medication or insulin that maybe I'm not familiar with, then I would then go to our Consultant or someone who is more experienced* (N1p3).

When asked what informed her prescribing decisions, Angela (Pharmacist 3) replied that she changed her prescribing practice when guidelines changed:

> *For example, when it came out about lidocaine being used so much for unlicensed indications. So I will now actually look up that now and stop it when I can. So when guidance comes out, it does change your practice. Or at the start for stroke, you used to always get simvastatin 40mg whereas atorvastatin got a bit cheaper and it is much better and Trust guidance changed* (P3p8).

Participants described making the best use of resources as being important in *ensuring each patient gets the right medicine*. I have used the word "resources" as a collective term for time, staff, expertise and money and will outline what participants said about each below. With respect to making the best use of resources in general, participants spoke about redesigning and streamlining the way medicines management systems worked; trying to get tasks done quickly to improve the flow of patients through the hospital; having the right people doing the right things and trying to do their best under

the circumstances. These were extra *checks and balances* which they adopted in their practice.

All the healthcare professionals who were interviewed made reference to time in a number of different contexts. Making the best use of time and prioritising work were early codes and categories which were integrated into the strategy, *using checks and balances*. Doctors and pharmacists in particular described prioritising what they did. Rebecca (Pharmacist 1) prioritised her workload in a number of ways. Firstly in terms of prioritising patients with particular illnesses which required a critical medicine and then making sure the right drug has been prescribed or stopped:

> *I personally always prioritise my patients and their medicines in terms of, so you have your guidelines, you have your patients who would be on their critical medicines, so your Epilim, your epilepsy patients, your Parkinson's patients, your dementia patients, your patients who are nil-by-mouth and have to, as I said, be changed to oral and also those patients who are new presentations such as strokes. So you are focusing on ensuring they have their aspirin or if they have had a haemorrhagic stroke that they don't get their thinners and that there is no enoxaparin* (P1p3).

She also prioritised specific tasks to ensure that the patient's care is managed as safely as possible:

> *Or else, whenever you are in the acute medical setting, prioritising medicines in terms of who has been in, who needs a drug history and who has to be out the quickest to free up a bed. That sounds terrible but in that different setting then my approach would be very much that you get your drug histories done to ensure that the patient is safe, that their discharge [prescription] is correct, that it goes quickly through pharmacy and that they get home with the correct supply* (P1p4).

Angela (Pharmacist 3) spoke about prioritising her work:

> *We have an SOP for prioritisation but I just know how to prioritise. Discharges are always the top priority. I know I won't prioritise a discharge if there is a Parkinson's patient or something more urgent or somebody seizing or they need their anti-epileptics sorted out. I will do that before I do a discharge even though they are number one. Discharges come first then after I finish the discharges it will be a medicines' reconciliation and I will put them in order of priority. So this morning, I had seven to do so I will put them in order on the clip board. It means if I don't get to do a couple then it will be the lowest priority ones to try and minimise risk. Then there are the in-patient reviews that would come last, but again depending on if someone is on Sando-K and there is no stop date, I will prioritise that. I will make sure that is done in the day whereas if there was someone on magnesium with no stop date, I could do that tomorrow. I just know what the most important jobs would be (P3p12).*

In outlining what has changed in hospital practice, Patricia (Nurse 1) spoke of having increasing time pressures, keeping patients alive longer and using more complex medicines. She said:

> *The straightforward patients don't come into hospital anymore (N1p5).*

When asked what she would do to design the perfect medicines optimisation system, Angela (Pharmacist 3) commented:

> *I would like more pharmacists probably. You don't have time. Time is a massive issue for medicines optimisation, for example, patient choice. You don't have time when you have ten discharges in a ward to go and talk to a patient about their medicines and how they are doing with them and can they take them okay and can they swallow them? In an ideal world that*

would be great but in an acute hospital when you are very busy unfortunately you don't have time to fully do that (P3p11).

She added:

More incident forms being done to improve patient safety and for learning. There are not huge amounts of time for anyone to do that and I know that it is very time-consuming and you have a lot of other things to do, but sometimes it isn't prioritised as the top thing (P3p12).

Karen (Pharmacist 2) mentioned that pharmacy is good at juggling lots of balls and this has contributed to them taking on more roles.

When speaking about administering medicines, Shirley (Nurse 2 said):

It would be brilliant to find a way that makes it straightforward – no interruptions, just plain easy, straightforward. Here you go, take your tablets. Something similar to blister packs already made up on the ward would be nice but obviously I understand that we need to make sure we know what we are giving (N2p13).

Deirdre (Pharmacist 4) described pharmacists doing what they needed to do to keep patients safe, going the extra mile. She spoke of the additional time which pharmacists, who had taken on new clinical roles, needed to make sure that medicines were right. This was partly due to having access to a lot of additional information which they looked at before reconciling medicines. She said:

The amount of time it takes a pharmacist to check the different sources and get the right medication prescribed for the patients while they are in hospital. Checking the Kardexes are right and communicating to the doctors when things aren't right and getting things changed. It takes a lot longer (P4p6).

The design of different parts of the system for using medicines did not always support participants in making the best use of resources. The consequences of this would include medication errors (some resulting in patient harm), professionals feeling that they were not doing as good a job as they would like to, stress and exhaustion. There seemed to be a comfort taken by medical staff from *using checks and balances* in the system to allow them to address their workload - knowing that a pharmacist and nurse would both be checking what they had prescribed before it reached the patient. Whilst it was good to have these checks in the system, they should not replace paying attention to detail and focusing on prescribing accurately.

The need to use finances effectively was mentioned by some participants. Deirdre (Pharmacist 4) when asked if healthcare professionals inadvertently put up barriers to the way medicines are used said:

> *Yes we throw up barriers around selection [of expensive medicines]. We throw up barriers because we want to make sure we get value for money. We have product standardisation and we decide this is what we are going to allow and we work on formularies to kind of restrict down the prescribing in a sensible way. We are doing that in order to save money to be able to pay for the newer, more expensive things that could potentially save lives. Those are barriers to access, but they are necessary (P4p25).*

Angela (Pharmacist 3) said:

> *Money is probably a big thing as well - budget constraints. Day-to-day it doesn't really affect me on the ward. I will change things if I know it will be cost-effective but to me personally, if it is doing the patient good, I can't say I don't care about money, it is not high on my list of things really…if I can save money I will. For instance, liquids are really overused for peg patients. Day-to-day I am not hugely overburdened by cost restraints. It would be the ward manager probably that has that problem once she gets her budget and sees the costs (P3p14).*

However, apart from a reference made by Joan (Doctor 1) to prescribing restrictions in primary care, the other participants did not refer to financial matters.

Deirdre (Pharmacist 4) spoke of how she can see pharmacy staff beginning to get stressed and get things out of proportion. She spoke about trying to pre-empt or avert a crisis by intervening and reassuring staff that they can only do so much. She went on to describe how stress manifested itself in doctors and nurses:

> *[Stress manifests itself] in a similar way [in doctors and nurses]. Sometimes a job that should be straightforward becomes not straightforward. Staff just need a little help and support. You see a lot more mistakes happening when staff are stressed (P4p9).*

She went on to outline new ways of working that she had introduced to ease pressure in the system with respect to medicines. Often these new ways of working brought additional checks and balances into the system.

Each interviewee made reference to new ways of working, to changes being made to practice associated with how medicines were managed in their area. Many of these involved the introduction of a new (or current) member of the staff who would take on a new role or responsibility. The most appropriate professional would carry out specific roles. This was viewed as an improvement which made the process of using medicines more streamlined and the ward team's working lives easier. This freed up time to focus on other tasks and helped in *managing risk* in the system.

These changes included introducing:

- Ward-based clinical pharmacists and technicians.
- Independent pharmacist and nurse prescribers.

- Nurses who focused solely on administering medicines.
- Specialist nurses and pharmacists in acute hospitals – inpatients and outpatients.

These changes contributed to changing the medical hierarchical model of working, increasing the recognition of the benefits of nurses' and pharmacists' roles, enhancing multi-professional working and in general, making the system more robust.

Most participants spoke of having a clinical pharmacist and pharmacy technician based on the ward on which they worked. For some, this had been practice for a number of years and for others, this was something relatively new which they were still marvelling in. The approach was described as integrated medicines management (IMM) and these roles introduced a variety of *checks and balances* onto the ward.

Cathy (Nurse 4) talked about how the integrated medicines management system allowed nurses to change from administering medicines from a trolley to administering a patient's own drugs from the patient's bedside locker and seeing this as a safer approach:

> *You have time to interact with your patient as well and you get to know what medicines are specific for them* (N4p4).

She added:

> *I think there is less risk of, you know what nursing is like, you get interruptions quite a lot, you could easily be picking up the wrong thing in the trolley whereas in their cupboard it is specific for them [the patient] and I think it is a lot safer system* (N4p4).

Sally (Doctor 3) summarised what most of the nurses and doctors expressed:

> *So pharmacists are a key part of acute medicine and we miss them when they are not there. They are great at coming in and knowing what is missing, what should be done and what should be adjusted for the GFR and things like that* (D3p3).

Doctors and nurses spoke proudly about their pharmacist who acted as their advocate in pharmacy, speeding up the supply of medicines.

Deirdre (Pharmacist 4) spoke of staff working differently compared to when she first qualified:

> *Roles have changed now. Years ago it was the doctors that prescribed and the pharmacists and nurses worked quite separately. Now the nurses can prescribe and the pharmacists can prescribe too, so there is much more sharing of roles* (P4p9).

Pharmacists were able to build on their clinical role at ward level by continuing to develop new ways of working. Caroline (Pharmacist 5) described how she has picked up on therapeutic drug monitoring as being important on her ward and has developed the pharmacist's role in that. She described it as something which doctors maybe didn't view in the same way that pharmacists did, not placing the same importance on it. She described building on her undergraduate learning on the subject and using this in practice. She said:

> *We would find a lot, for example, a gentamicin level and it would come back high and we would say, but what time was it taken? Is it taken at the right time and we are maybe the ones that prompt that conversation to look at rather than just saying its high so let's hold the next dose. I suppose I've kind of developed our role in that, that we are the ones that tend to manage that a lot and the junior doctors will come to us then to ask, "what will we do with this next dose, do we need another level?"* (P5p13).

The role of independent pharmacist and nurse prescribers was highlighted by a number of participants, some of whom were independent prescribers. It was interesting that the initial nurses who volunteered to participate in the study were prescribers and I had to proactively seek non-prescribing nurses. I interviewed one nurse prescriber and three pharmacist prescribers as well

as a fourth pharmacist who was training to prescribe. All of the independent prescribers spoke of the benefits to patient care and *managing risk* of being able to prescribe. These included:

- Making it easier to change inappropriate or incorrect prescriptions.
- Resolving concerns in a more timely way.
- Being able to provide complete, joined-up care for patients.
- Being able to work more closely with patients.
- Feeling more fulfilled in their professional role.

They also described their prescribing practice within the overall work of the multidisciplinary team as opposed to working as lone prescribers in isolation.

Patricia (Nurse 1) spoke of her prescribing role with enthusiasm. She prescribed only drugs to treat diabetes and worked closely within guidelines:

> *There are loads of medications out there but I work within my guidelines obviously and what best suits the patient and what is going to have the better outcome* (N1p3).

When explaining how, as a prescriber, she interacted with the other members of her MDT, Patricia spoke about the weekly two-hour meetings where positive experiences and potential problems with drugs were discussed. Being able to prescribe gave this specialist nurse a feeling that she is working at a higher level for her patients and team. She described it being so much easier and making better use of time:

> *I know I can go in and say, well I would recommend and be alright to prescribe it and know that it will be followed through and it is your recommendation and I am positive that this is going to work and this is the right way forward and this is what we are going to do* (P1p9).

Rebecca (Pharmacist 1) spoke of the benefits of pharmacists being able to prescribe for patients and for the overall system:

> *Yes it definitely is beneficial if a pharmacist could make the changes there and then. I think it would also cause a lot less errors, be a lot safer for patients. They would have better all-round care and I do also think their discharges would be an awful lot quicker because you're not worrying about getting Kardex changes, doing a whole big drug history, you're not ending up doing a wee tiny med rec[onciliation]at discharge and you are sorting the problem there and then* (P1p12).

Polly (Pharmacist 0) commented:

> *Non-medical prescribing has shifted things slightly. It's still evolving and it will be interesting to see what happens over time especially with complacency. Medical staff, not immediately, but maybe within 1-2 years, get a bit tired with the monotony of prescribing. Carelessness can come in, there is always someone else coming in checking my script, "I'll just get it done quickly and will just wait for the phone call". I wonder if that will come in with the NMPs where initially they may be very, very cautious in terms of prescribing, paying meticulous attention to detail, if that will wane as well as it becomes routine over time* (P0p7).

She commented on a difference she has seen between nurse and pharmacist prescribers:

> *I also wonder, I've seen some nursing staff who have less of an air of caution than I see in pharmacists taking on that same role. They say, "that means I can prescribe anything" and we [pharmacists] have to say, "no, just within your clinical sphere, your scope of practice". Pharmacists tend to be very tentative prescribers and build their confidence. Nurses, some of them are off and running* (P0p8).

Nurse and pharmacist prescribers spoke of the benefits of being able to prescribe and sort things out quickly and efficiently. This was supported by some of the doctors (Sally and Mary).

The pharmacist prescribers who participated in the study each had at least ten years post-registration experience and had each worked on a particular ward for a number of years and felt part of the ward team.

Karen (Pharmacist 2) said that she can:

> *amend discharge letters and Kardexes within my competencies, so a lot of things I would discuss with the doctors at whatever grade I felt was appropriate…..Sometimes I will make a decision, I don't necessarily have to speak to a doctor but I think on the ward you are very much seen as part of the multidisciplinary team and the consultant is still the person with the name above the patient's bed* (P2p3).

She said that she was a cautious prescriber and again saw the benefits of her being able to prescribe in improving medicines safety, proactively changing prescriptions as opposed to leaving a note to get a medicine changed and making changes at the right time.

Rebecca (Pharmacist 1) outlined her current training as an independent pharmacist prescriber. However she expressed a need for pharmacy leaders to define what the pharmacist's prescribing role was, with reference to the legislation and also to provide clarity for pharmacy and non-pharmacy staff. The extent of pharmacist prescribing roles varied across Northern Ireland and Rebecca believed that this was confusing especially for medical staff that moved between hospitals.

The more senior doctors who were interviewed spoke of the development of pharmacist prescribers, seeing the benefits in safety and doing things at the right time.

The nurses highlighted having a named medicines nurse on the ward that focused on administering medicines as being another check and balance. This role recognised the importance of the medicines task, provided continuity by having one nurse as the person to speak to about medicines issues, for example, waiting for a drug blood level result to come back and, it was hoped, reduce interruptions on medicines administration rounds.

Shirley (Nurse 2) spoke about the nurse who is administering the medicines wearing a tabard with a sign saying, “do not interrupt.” This empowered more inexperienced staff to focus on administering medicines. She said:

> *There are people that will turn round and say, “sorry I am doing medicines, I can’t be interrupted”. Obviously junior staff, it takes a wee bit more for them to stick up for themselves. Then you would see them locking up trolleys- it’s all about being able to say, “no I can’t do this right now”* (N2p9).

Patricia (Nurse 1) described the new nursing approach to administering medicines:

> *I would say definitely [it has changed]. Before when you were doing medicines people would have come up and said, “Where’s this? Where’s that? Can you get me that? Can you do this?” Now specifically we have got nurses and their main role that day, that morning, and job is to give the medication out. So they are focused on that and that only (*N1p10).

Some participants spoke about nurses and pharmacists who had developed specialist clinical roles. With respect to how she worked with new Specialist Nurses, Joan (Doctor 1) spoke of changed practices:

> *Because they are all Nurse Specialists, they are all highly trained. They are able to feed back and say, “no, can we try this first?” So you know it is interesting. A melding of ideas* (D1p8).

Deirdre (Pharmacist 4) mentioned Consultant Pharmacist roles in working with older people. She described pharmacy Medicines Optimisation in Older People (MOOP) teams which were developing to help with supporting and monitoring medicines use in older people to help keep patients out of hospital.

6.2.4 Summary

All participants described *using checks and balances* when working with medicines. These helped in *managing risk*. They included internal, personal checks and balances but more usually having wider systems checks. Each professional group described the importance of reviewing prescriptions regularly. This was a key, routine check in the system and errors occurred, for example, missed doses when this did not happen. Other *checks and balances* in the system included, making good decisions, checking information with patients and carers, structuring each day's work, prioritising tasks, being able to access information, making the best use of time, introducing new ways of working and developing new roles. These were integrated into practice.

6.3 Working together (strategy)

6.3.1 Introduction

In this section I will provide an overview of the strategy *working together* using supporting data. The term *working together* as opposed to working as a team has been used as the data shows that, when working with medicines, doctors, nurses and pharmacists individually bring a unique perspective and carry out a specific role, as well as contributing to the benefits of the work of the multidisciplinary team. In Chapter 5, I laid out the data on the individual roles and responsibilities of each of the three professional groups in

managing risk. In this next section, I will build on this by exploring how participants described working in a team, their multi-professional interdependencies and finally, the data on how they communicated with each other.

6.3.2 Working together

A range of healthcare professionals work on acute hospital wards and this study focused on doctors, nurses and pharmacists. Physiotherapists, dieticians, speech therapists, social workers and pharmacy technicians were also mentioned by participants but their roles do not fall within the scope of this research.

Most participants made reference to how *working together* as a member of the multidisciplinary team (MDT) on the ward was a strategy for *managing risk*. Nurses, in particular, spoke of how everyone worked together and supported each other to do a good job. Pharmacists were keen to confirm that they were well-accepted members of the ward multidisciplinary team but also members of the pharmacy team as well. Doctors spoke of team-working and listening to the views of the MDT, but did not specifically refer to themselves as being a member of the team.

I interviewed four individuals who worked together on the same ward; Shirley (Nurse 2), Jackie (Nurse 3), Caroline (Pharmacist 5) and Sally (Doctor 3). They were able to speak about *working together* from that perspective, although the fact that they worked together was only referred to by the nurses. Shirley spoke of everyone as, “having each other’s backs” (N2p7). She also knew at the start of a shift whether a day was going to run smoothly or not depending on what team members were on duty.

When asked how powerful she felt in being able to make change or highlight things, Jackie (Nurse 3) said that she felt confident asking doctors if something didn’t feel right because the staff communicated so well together. She continued:

> *I think it is just a good rapport that we all built up together and everybody has been here now for maybe over a year, the same team. It has been quite good and then when the doctors change over, because the nurses and pharmacists have all been here a while, they can build up and give the doctors some support when they are just new into the setting* (N3p8).

All of the pharmacists interviewed spoke about being a member of two different teams; the ward-based multidisciplinary team and the pharmacy team. They had competing loyalties but even though they were pharmacists to their core, they felt, most of all, part of the ward-based team. Karen (Pharmacist 2) described a tension between being the pharmacy person on the ward and being that clinical, ward-based person that is going to benefit the patient in the bed at that time. She spoke of wearing two hats:

> *You are very aware you are the face of pharmacy and you've still got that enforcement role. So there are the legal aspects you need to keep right and you still have the cost savings and you don't want them to over-order or order the wrong things. Then you are trying to promote the other side of the safe use and prescribing and do your clinical role as well* (P2p12).

When asked what she thought other members of the multi-professional team viewed her role to be, Angela said:

> *Probably just giving out tablets and putting them in a bag. Some of them have a better understanding than others. Some of them know you do a medicines' reconciliation which is important. There is one nurse in particular that would come to me and ask me if I have done a medicines' reconciliation before she even does her medicines in the morning because she knows there can be mistakes made. Others have a very poor understanding. If you are told there is a discharge and they say in the same breath, "what time will that be?" There is clearly no understanding of what you do. Or you have to check what they are on or is there a new anticoagulant, is there the acute care at*

> *home team? Is it complex in some sort of way that you can't instantly answer what time it is going to be ready at* (P3p13).

All of the pharmacists said that it took time to become part of the ward team, with Rebecca (Pharmacist 1) believing that pharmacists should have longer rotations on each ward to build relationships. When asked what working with the team looked like, Angela (Pharmacist 3) said:

> *Just being there really, being available on the ward, talking to people, being approachable. Like I said, with the consultants, I think it takes a while to get there with pharmacy. It takes a while to develop those relationships. The consultants will come to me and chat to me, all of them will. The nurses come in for things, the dietician, and social workers will come to chat about how we are getting someone home with their Medi-dose. I think it is just important to be there, be friendly enough that people will come and ask you things and respect what you are saying* (P3p6).

Sally (Doctor 3) also recognised that her relationships with the pharmacists developed over time:

> *First I think often in initial encounters, they [pharmacists] are in correction mode and highlight things. If you are not used to having a pharmacist looking over you, the initial reaction is defensive. Then as you work with them day-by-day, the relationship evolves* (D3p4).

So, the role of the pharmacist on the ward team is valued by all professionals but is a role which is developed over time.

Medication incident forms are completed when an error occurs. These forms are used to identify learning and trends. They can be completed by any member of staff with the ideal being that they are completed by the person who made the error. When talking about completing incident forms about errors which other team members had made, Angela (Pharmacist 3) was clear about her professional responsibility:

> *No matter what relationships you build with the team, you have to think of the patient first. If it is going to ruffle a few feathers, well it has to be done but you just have to do it in the right way so as to keep the good relationships with the team* (P3p10).

Some pharmacists spoke of being on multidisciplinary ward rounds with the consultant, junior doctors, nurses and other team members as well as the patient and the benefits of being able to discuss and make decisions there and then, as opposed to after the fact. Other pharmacists described being members of the multidisciplinary team but walked around after the medical team had completed their ward round, picking up concerns. They then had to approach individual medical staff to resolve problems after the ward round. These two different ways of working often reflected the busyness of the ward, the experience of and the competing pressures on the pharmacist who may have had to work a dispensary shift and so were not on the ward all the time.

Jayne (Doctor 2) was cognisant of her lack of knowledge of medicines and needing the support and advice of the multidisciplinary team (MDT):

> *That is what has led me to feel that I do need the MDT to help me because I know there is so much of medicine that I don't know and particularly with regards to medication. I just know how little knowledge I have in comparison to how much there is. That's why I am so much more willing to have other people because they have their own specialty, their own knowledge, their own expertise and if you put it all together then we are all going to be much better off* (D2p7).

She spoke about how her experience of working in a multidisciplinary team has changed her professional practice. She had learned the importance of listening to other healthcare professionals, valuing their input and empowering others to ask questions and help guide her decisions.

Frank (Doctor 6) commented on how he used a formal multidisciplinary team (MDT) approach to manage risk both locally within their hospital and regionally, as part of regional MDT meetings. The local team re-introduced a new, high-risk treatment into their hospital. This involved the whole team meeting up to review and write a new protocol, providing profession-specific training and walking through each stage of the process.

All junior doctors (FY1s), with one exception, felt that they were made welcome in each team they joined. The implication of the negative case was that the unwelcoming team was the team of doctors (surgeons) as opposed to the multidisciplinary team on the ward. Junior doctors felt well-supported by their seniors during working hours but less supported out-of-hours. Whilst they did not attend consultant ward rounds, FY1s felt able to ask questions of all healthcare professionals and that they were encouraged to do so. They did not allude to being a member of any particular team. FY1s all described seeking support and advice from nurses and pharmacists as well but did not describe this within a team context. Jack (Doctor 7) commented:

> *I actually quite like moving around teams. I think it's nice and it's nice to get to know who people are on all different teams. We are familiar with the nursing staff because we do out-of-hours but more so medical teams. It is nice to get to know the new people and so far they have all been super and very welcoming and integrated straightaway* (D7p3).

When asked how the system adapted if there was a weaker member of a team, Mary (Doctor 5) described an experience of knowing of a weaker colleague and said that if she had to work on the same ward with them that she would double-check things with the nurses and check what the individual was doing. She would make sure the nurses were comfortable with the individual's practice and if not, tell them to come to her or a senior colleague.

Pharmacists and doctors in particular described being supported and seeking additional information on medicines from specialist colleagues from within their own profession, with doctors also getting information from a pharmacist. Nurses sought information on medicines predominantly from pharmacists

and then doctors. Two pharmacists and one doctor worked with colleagues on a regional basis, for example, producing guidelines as a member of an older people's pharmacist peer network or making decisions as a member of a regional multidisciplinary team.

However, as well as feeling supported, some participants raised concerns about having to protect themselves when *working together*. Cathy (Nurse 4) spoke of needing to document concerns which she had raised:

> *For us, we are looking at the Kardex every day to make sure we have flagged that [a missed drug] up. If we have flagged that up and no one has taken any notice, then we have protected ourselves and unfortunately it is all about protecting* (N4p11).

Rebecca (Pharmacist 1), made reference to there being a blame culture where she worked:

> *I think that we have a very big blame culture. I think that nursing staff are a lot more cautious of what they do and what they are doing with medicines than maybe what they did at the start whenever I started in the Trust* (P1p6).

However these were the only references which participants made to needing to protect themselves when errors were made.

A number of participants from each profession also described the change in relationships from a medical hierarchical model to more collaborative working where everyone's opinion was valued equally. Karen (Pharmacist 2) recounted her experience of these changes:

> *I don't know if it is just culturally that those barriers have got broken down and the doctor is maybe not seen as the big doctor or the person in charge. They are still in charge and they still have the responsibility but I think they realise and appreciate that there will be a better outcome for the patient if they do accept everybody's input and even in terms of listening to the patients and their families now* (P2p17).

In relation to her experience of working as part of a multidisciplinary team, providing care to older people, Jayne (Doctor 2) commented:

> *We were all [the multidisciplinary team] sitting around and all bringing issues about what the patient went through, each patient on the ward. That impressed on me that in the past it would have been the doctor's word is law, this is what we are doing. If things don't happen it is not because the doctors did something or didn't do something. It is more when you have that MDT and you see exactly how much they do and how it influences the patient's progress through hospital. It has really taught me to listen to what other people say* (D2p2).

Other doctors highlighted the importance of involving the nurses in decisions about medicines administration and involving pharmacists in decisions about complex drug choices in particular. Patricia (Nurse 1) commented on this changed approach:

> *Gone are the days now that we are moving from the hierarchy of you are just the nurse and I am the doctor. They will respect and ask, "well, you are the one that is administering this so you are the one who is more familiar with this – what do we need to do?"* (N1p26).

Representatives from all three professions described working with and supporting healthcare professionals at different levels of their career. Junior doctors felt well-supported by senior medical staff as well as by nurses and pharmacists. Shirley commented (Nurse 2) on the nurse's role in this:

> *With doctors, especially junior doctors, just coming fresh on, it would be us [nurses] that would keep them right as best we can* (N2p11).

In listening to especially nurses and pharmacists, it is apparent that there are interdependencies between their work and that of the other team members. These can be viewed as cogs.

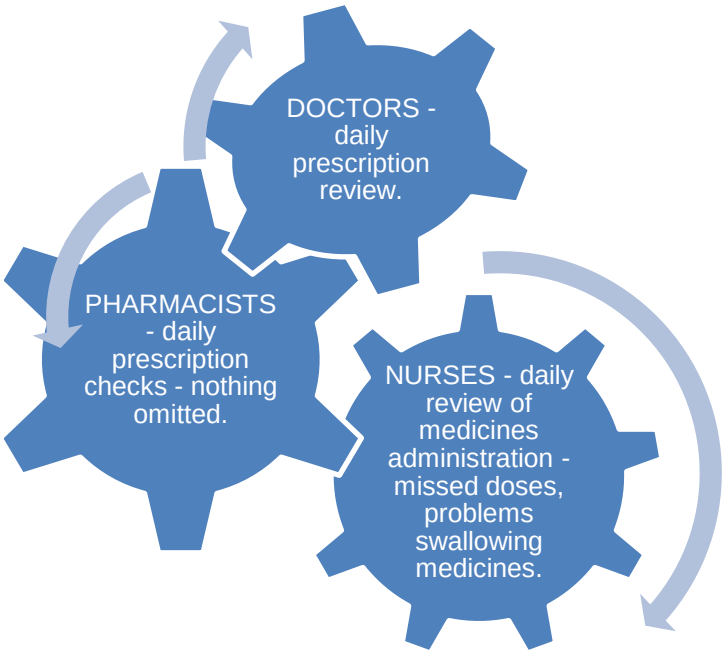


Figure 8: Multidisciplinary interdependencies when working with medicines on an acute ward

Nurses described having a responsibility for making sure they are administering the right drug to the right patient and to do this, they must make sure that the prescription is right. Shirley (Nurse 2) highlighted this:

> *It is important for us to make sure that we have it right but it is important to make sure that it is documented right as well. Also making sure the timing is right for critical medications – it is our responsibility to make sure the patient gets it on time* (N2p7).

Equally, pharmacists needed to check that the prescription was correct in order to dispense or supply medicines, as well as it being part of their professional, ward-based clinical role. Therefore the system is designed so that nurses and pharmacists cannot carry out their roles without the doctor, or prescriber, having completed their role accurately.

Healthcare professionals are aware that they need to be constantly checking that the prescription is right as part of their independent professional roles. Therefore medical staff will always know that others are checking their prescribing and this gives a sense of the risk being managed and somewhat reduced because of this. Some comments from Sally (Doctor 3) and Angela (Pharmacist 3) on this were:

> *They [the pharmacists] have our backs* (D3p5).

> *They [doctors] know they have a back-up there but it can sometimes be dangerous because they do have the attitude sometimes, "oh well sure pharmacy, somebody will be checking it anyway*" (P3p7).

Doctors spoke of having a lot to do and making sure they did each thing well. They seemed to be able to assess the relative risk of each task and prioritise work accordingly. This way of working however, could impact on the work of nurses and pharmacists who had to tie up loose ends and who could not progress with some of their own work before making sure a prescription was correct.

As part of *working together*, communicating with other healthcare professionals and with patients and their carers was mentioned by all participants. Participants regularly asked colleagues from all three professions for advice on medicines, especially when making decisions about things they were not familiar with or when seeking clarification.

Most participants asked pharmacists for information on the use of medicines, usually to build on basic information which they already had read in reference books such as the BNF. This was also the case for pharmacists who asked for information on particular drugs from other pharmacists who had experience of their use or who worked in a particular specialty. This additional, deeper knowledge of the drug in-use was respected and sought after. Pharmacists referred to doctors and nurses when they wanted to understand more fully the clinical or social context in which medicines were being used. Caroline (Pharmacist 5) said:

> *The diabetic nurses and those sorts of teams that come to the ward can be really invaluable when you are thinking about medications and what we are going to do with them and to have a specialty coming in, that's brilliant. Palliative care teams and all those teams coming in are great for advice (P5p15).*

Nurses asked pharmacists for reassurance on the use of a particular medicine when deciding whether to administer it. Patricia (Nurse 1) commented on a pharmacist's role in supporting her conversation with a patient:

> *I go on to a ward and sometimes it is better to ask the pharmacist about your patient than the doctor. I'm not being disrespectful to the doctor but the pharmacist will know what they are on and they will know the details like they eat their dinner at this time. They know the patient, they speak with the patient, they review them and it is amazing. There is more clinical time there. Even pharmacists we work with have one-to-ones with patients. It is amazing and I love it because then it is like a consultation on their own, and then I could say," would you mind coming in?" and, "do you think this is okay?" and, "will that go with that?" (N1p19).*

Sally (Doctor 3) asked other specialists, for example microbiologists or renal physicians, for advice on prescribing a drug she would not use routinely. This allowed her to manage the higher risk of making a prescribing error with an unfamiliar drug.

All junior doctors interviewed spoke of the ease with which other professional colleagues (doctors, nurses and pharmacists) answered their questions and helped them to make prescribing decisions.

Nurses and pharmacists described communicating with and signposting doctors towards making decisions on what was usual prescribing practice on a ward. Cathy (Nurse 4) talked about suggesting things to medical teams:

> *The medical team obviously has the ultimate decision on medications but for us we will happily go and suggest things to the medical teams especially for the likes of our COPD patients, at end- of- life, could we add in more Oromorph/Oxynorm for the relief of breathlessness? That is just from experience that we have had and we would be saying [to new doctors], "look this is what works for our patients" or the likes of even suggesting syringe drivers (N4p10).*

The most common way of communicating on acute wards was by word of mouth, although participants also wrote comments on Kardexes or made lists of tasks in communication books. Jackie (Nurse 3) explained:

> *A lot of the communication would be verbal. Then they [doctors] will write on the Kardex if they want any medications held and they will write for it to be reviewed then. Generally it is quite clear. It has improved a lot* (N3p11).

Caroline (Pharmacist 5) added:

> *So you will see some of our doctors writing when they are prescribing even an anti-epileptic, they will write in there," critical medicine - give on time"* (P5p23).

When asked how a doctor decides whether to pass on information verbally or in writing, Jackie said:

> *I don't know if it depends maybe on the individual. It is hard to speak for the doctors because I think it depends on what way they find it easier to work for themselves. Nine times out of ten they do both, just to make sure that nothing is missed …. if the doctors change round the next day* (N3p12).

Deirdre (Pharmacist 4) however said that everybody would document what they had done:

> *Doctors would document in the patient's notes, if they've counselled or advised a patient, why they need to take something and likewise with a nurse. She would document in her nursing notes if counselled or added something extra to help a patient, and likewise a pharmacist* (P4p14).

Cathy (Nurse 4) described the importance of knowing what was going on with medicines and being able to answer queries on the consultant ward round. She gave an example of when a medicine is held for a few days, for example, a diuretic. The prescriber will put the code '8' into the administration box on the Kardex:

> *I have a patient whose furosemide was 8ed over the weekend. I knew that, I relayed it to staff and then this morning on the ward round, the new consultant wanted to know. I was able to relay the information and she was able to review that* (N4p5).

Sometimes that medicine will continue to be held until someone proactively rescinds the order and patients may not get their drug until the next medicines review. Cathy continued:

> *Sometimes doctors will '8' medications and they are not always reviewed on a daily basis. That's where the patient could be missing an important drug for days on end. So it is very important and it is our responsibility to be flagging that up on ward rounds* (N4p6).

Mary (Doctor 5) highlighted her practice of keeping nurses in the loop with ward round decisions and making sure instructions are clear:

> *I would go up to them and say, "Would you mind, we are starting this new tablet, is that ok?" And then just go through it and make sure they were happy with it* (D5p16).

Similarly Mary would communicate with pharmacists:

> *I would just say to one of them, "I've done this discharge. Would you mind checking the medications for me?" or, "I think this is a blister pack. Would you mind chasing the medicines for me, organising that*?" (D5p17).

Ward-rounds or daily multi-professional white board meetings were also highlighted as effective and efficient ways of finding out what was happening. Karen (Pharmacist 2) explained:

> *The ward sister and the rest of the team would run through each of the patients in about ten or fifteen minutes* (P2p4).

Caroline (Pharmacist 5) described how she made notes on the Kardex to prompt doctors:

> W*e note things on the Kardex as well if they are not necessarily urgent but they may require reviews, say if someone needs to review a discharge. So I know that a doctor will see that, if I write on it. If the doctor is doing a discharge letter, that will prompt them to come and ask me if they are not sure what it means or ask a senior or review it and make a decision themselves for whatever it might be* (P5p6).

All pharmacists mentioned having to decide what level of doctor to query a prescription with. Caroline (Pharmacist 5) commented:

> *I suppose the big thing for us, which is a big learning thing for me here it is picking what grade of doctor you are going to approach for the query* (P5p6).

Most pharmacists spoke to higher-graded medical staff and would escalate queries to consultants if they were uncomfortable with an answer from a lower-graded doctor. It was recognised by participants from each professional group that the most accessible doctor could be the one with least knowledge of what was happening with a patient's medicines.

Polly (Pharmacist 0) spoke about the importance of knowing how to approach different medical staff, especially if you did not know him or her:

> *It can vary enormously depending on whether you have a working relationship with the doctor or if you have not met before. You can take more shortcuts in communication if you know them. You know how they think and how to communicate to get the outcomes you want to get* (P0p3).

She spoke of a scenario she had been part of a few months earlier where her query had not been acted upon. On reflection, she realised that adopting a different approach may have helped:

> *It was about a patient and the choice of drug. Very quickly in the conversation [with the doctor], I realised it was not so much about that patient, the issue for the prescriber was being forced to use guidelines. If I had approached the conversation and hadn't mentioned this is what's in the guidelines, I'd have got a different response. So it's learning all of those kinds of things and getting to know the different influences that other people have in making decisions* (P0p4).

So, building relationships is important to supporting healthcare professionals *working together* constructively and *managing risk*.

Jackie (Nurse 3) described the dynamics of doctors, nurses and pharmacists communicating with each other on her ward. She spoke of the nurse as sometimes being involved in conversations between pharmacists and doctors about medicines, acting as a go-between:

> *We all work pretty well together, so if the pharmacist picks up on anything, they let us know or they even let the doctors know and we will all work together. There is good communication because if there is something the pharmacist feels needs changed when they are doing their medication review, they will let me or the doctor know, and then they would tell me if they've told the doctor or other way about* (N3p7).

Jackie was the person who administered most of the medicines on the ward during her shift. She also seemed to be the central person who passed on information on medicines between shifts and other colleagues. In that context, she gave an example about waiting for drug level results:

> *So they would let me know because sometimes the doctors would go home at 5pm and then the [drug] level is not due back until a wee bit later than that. Then they would let me know what I was looking for so that when it does come back, I know if I am able to give it [the drug] or not. Then I can let the doctors on the long day know what the pharmacist and doctor had said before that* (N3p11).

In all of these scenarios, there was no mention of having a written protocol for how information on medicines was passed on between professionals and between shifts. All participants commented that the doctors, nurses and pharmacists on the ward communicated well, with a small number saying that in the past, communication could have been poor, for example about drugs being withheld, but now, with medicines being reviewed more regularly, this has improved.

Caroline (Pharmacist 5) said that pharmacists are communicating with nurses all the time, mainly relating to the patient's home circumstances, as the nurses tended to know the patients best. She continued:

> *So we do a lot of communicating about who manages a patient's medications with the nurses. So you know, is it the sister or daughter or somebody there that we can ask? We would also prompt the nurses on a lot of thing. They would come to you with things that maybe we haven't seen on a Kardex or they would come to you, "does this look ok or is it usually prescribed this way?" So we do a lot of reassurance sometimes. We also then would communicate about missed doses* (P5p8).

Electronic communication of changes to medicines was described by Deirdre (Pharmacist 4) as being a current, potential barrier to effective communication:

> *I think the main barrier would be the electronic communication of changes to medications. You can see in the future a potential for everything to be fully joined up but we are not there yet. People are trying to improve and make changes but then they don't get communicated to the right people. So patients can sometimes end up being on duplicate medication or staying on things longer than they should because something hasn't been communicated to the right person; or it has been communicated and then slips back as the electronic system isn't updated* (P4p18).

6.3.3 Summary

The input of different professionals *working together*, each having different levels of knowledge, experience and training, is a strategy for *managing risk* when working with medicines. Working in a team, building relationships over time and knowing how to approach each other helped with this. Cognisance is taken of new staff who join established teams and learn new ways of working as they rotate between specialties. Nurses and pharmacists rely on the prescription being accurate before they can carry out their role of administering, dispensing or clinically checking a prescription. There is no reciprocated interdependency for doctors when prescribing initially. Doctors know that a nurse and/or a pharmacist will be checking what they have prescribed and whilst that gives them a level of reassurance, it gives nurses and pharmacists an extra job to do to make sure the prescription is right or complete. Getting advice from different professional colleagues was also mentioned. This was highlighted as a change from the traditional medical hierarchical model with more open communication improving risk management.

6.4 Ensuring each patient gets the right medicines (consequence)

6.4.1 Introduction

Strauss and Corbin spoke of consequences as follows:

> *Whenever there is action/interaction or lack of it taken in response to an issue.., there are ranges of consequences, some of which may be intended, others not* (1998:134).

Consequences can be further described in terms of their properties and I have tried to do this to ensure a richer and fuller explanation of what is happening here.

6.4.2 Ensuring each patient gets the right medicines

All doctors, nurses and pharmacists spoke about the consequence of *managing risk* when working with medicines as e*nsuring each patient gets the right medicines.*

It is important to note that whilst the consequences are written as positive statements, strategies for *managing risk* were not always successful. Therefore there is a continuum of consequences, defined further by their properties and dimensions, for example, *ensuring or not ensuring that each patient gets the right medicines.*

Participants did not give many examples of specific medication incidents but they were actively *managing risk*, with an inherent assumption that there was risk in the medicines management system. There were also unintended consequences of *managing risk* and I will make reference to both of these in this section.

The term *each patient* is used because all healthcare professionals involved in this study described making decisions in the context of an individual patient, using the best information available and looking into the potential implications for that patient as a result of a decision made at a specific point in time. Optimising medicines means putting the patient at the centre of decisions about medicines to achieve certain outcomes. Whilst this was not described overtly as being a strategy adopted fully by all healthcare professionals, the participants did describe practice moving in this direction.

Patricia (Nurse 1) spoke about how she prescribed in her specialist role:

> *Looking at my patient, looking at what their requirements and needs are, then I would base my decision on that (N1p3).*

Ensuring each patient gets the right medicines involves stopping inappropriate medicines (de-prescribing), as well as starting new medicines and this happened as a result of proactive prescription review. Joan (Doctor 1) spoke of how she worked with medicines:

> *It's one-to-one, it's what you do on a day-to-day basis, it is evidence of efficacy and then the problems you encounter with it and still then you have got your guidelines and your feedback from all your colleagues. It takes a heck of a lot to keep going at everything and I am doing it ok* (D1p12).

Not *managing risk* effectively resulted in errors being made, for example, patients having an inaccurate prescription or being administered or supplied the wrong medicine. Participants described this happening particularly when they were using a medicine which they were unfamiliar with, when they did not focus on their work or when they had insufficient time to complete a task fully. This was not *ensuring each patient gets the right medicines*.

All the participants wanted to do a good job and use medicines accurately, safely and appropriately to get positive treatment outcomes for patients. They spoke of working within guidelines and their professional Code of Practice and also having a level of job satisfaction to *ensure each patient gets the right medicines.*

Participants highlighted a number of possibly unintended consequences of *managing risk*. In Chapter 6, I described how professionals had developed new roles. This resulted in more collaborative working among healthcare professionals as well as between healthcare professionals and patients. This contributes to *ensuring each patient gets the right medicines*. It has fostered increasing joint decision-making and the development of a medicines optimisation approach. It also has resulted in new legislation and the beginnings of a shift in power relationships within healthcare.

Patients were also involved in ensuring that they got the right medicines. This was more than affirming that they were on the right medicines as mentioned in Section 6.2 on *using checks and balances*. Patients also made agreed and informed decisions about their medicines to ensure concordance. Joan (Doctor 1) commented:

> *I think more and more patients are getting more knowledgeable and powerful and it is really great when they do sit down and say, "Can we look at that list?" And I think yes, let's look at that list – why, why, why?* (D1p15).

Jackie (Nurse 3) added:

> *Then they [doctors] ask the patient what works for them at home?* (N3p7).

Frank (Doctor 6) spoke about involving patients in treatment decisions:

> *We do have a subset of those patients that would be young or think that they would like to follow a slightly alternative approach to their treatment and it does tend to be young patients. They think it through and it can be challenging being supportive of their conclusions, or trying to challenge them without actually running roughshod over their opinions* (D6p9).

Angela (Pharmacist 3) had seen a change in her own practice from having a paternalistic approach to starting a new medicine, to including the patient more in making that decision:

> *So I have changed a lot in that way, where I would ask the patient and talk it through with them and see if they are happy for something to change or trial them maybe without their quinine or whatever that may be* (P3p8).

Mary (Doctor 5) was the only negative case. She described a paternalistic approach still being taken in her clinical area when starting new medicines:

> *It is very much, "we are just starting this tablet"; it is not, "we think this tablet might benefit you, what do you think?"* (D5p29).

She went on:

> *It is not a discussion, it is kind of this is what you've got, unless we know it is an awkward patient …then we would be a bit more cautious of what we do and what we document* (D5p29).

I did not question what the participant meant by, "an awkward patient" and should have followed this up within the interview. Mary came back after the ward round to explain new medicines to patients almost covertly and hoping that they had no questions which needed to be fed back to the team.

Frank (Doctor 6) spoke about how patients tended to be quite involved with their medicines often because they had to understand how to take complicated medicines regimens as an outpatient. These patients got support from a specialist nurse as well as written information on their new drugs and compliance support.

These changes have also contributed to individuals, both healthcare professionals and patients, becoming more empowered to query the use of medicines.

Deirdre (Pharmacist 4) spoke about healthcare professionals being more aware of the history of medication errors occurring with associated consequences. She said that junior doctors in particular are more aware of this and that had resulted in them practising differently to junior doctors in the past:

> *I think they are much more open to asking questions and asking for help. Also involving the nurses and pharmacists more and not being lone workers. When I first qualified there were a lot of doctors that you would've had difficulty trying to convince that they weren't prescribing correctly or that they could do something slightly differently. I think it is easier now* (P4p17).

All of these individuals were *ensuring each patient gets the right medicines*.

6.4.3 Summary

The consequence of *managing risk* is *ensuring each patient gets the right medicines*, or reducing the risk that they might not get the right medicines. This consequence has a patient-focus, with the data indicating that healthcare professionals are aware and sensitive towards the need to involve patients in making decisions about medicines and self-reporting doing so. All participants reported striving towards this goal and articulated the methods which they used.

7.0 Discussion

7.1 Introduction

Holloway and Walker stated that, “the discussion focuses on the findings directly derived from the data and is not based on speculation or unfounded inferences” (2000:144).

Creswell commented that in the final discussion section of a thesis, the researcher should, “discuss the relationship of the theory to other existing knowledge and the implications of the theory for future research and practice” (2013:229). Urquart highlighted that the analytical generalisability of a grounded theory can be improved by, “relating it to other theories in the literature” (2013:169).

Whilst many authors have outlined the purpose of the discussion chapter in a grounded theory doctoral thesis, few have proposed a specific structure. The discussion of the grounded theory can be interwoven into the data analysis section of a thesis; however I have chosen to present the discussion as a separate chapter. This is to allow a greater focus on discussing the theory in relation to the current literature identified following the emergence of the theory.

Holloway and Walker (2000) provided an outline approach to the discussion chapter, underlining the importance of following the structure used when presenting the data, discussing individual findings as well as the research as a whole. I have used a modified version of Holloway and Walker’s approach, being mindful also of the need to answer the initial research questions. The chapter includes: a statement of the aim and initial research questions; an overarching reflection on the findings and their interpretation; the relationship of the findings to the previous literature, structured in line with the integrative diagram (Figure 5); a summary of findings, including new findings, implications for practice; implications for future research; the strengths and limitations of the study including a personal reflection on how I could improve the study and the conclusion.

I will also analyse the merit of the grounded theory – its strengths and weaknesses. In doing this, I have used a framework for assessing research evidence in qualitative studies, produced by the Government's Chief Social Researcher's Office (Spencer *et al* 2003) (Appendix 18).

7.2 Aim and initial research questions

The aim of this study was to produce a theory which explains how doctors, nurses and pharmacists work to optimise the use of medicines in acute hospital settings in Northern Ireland. A theory has been produced and it is outlined in the integrative diagram (Figure 5).

My initial research questions included:

- Do healthcare professionals work to optimise the use of medicines?
- What is each healthcare professional's contribution to working in a team to optimise medicines use?
- Why do they work in this way?
- How do individual healthcare professionals define their role with medicines?

The answers to these questions will be addressed in this chapter.

7.3 A reflection on the findings and their interpretation

This study has produced a grounded theory which explains how doctors, nurses and pharmacists work to optimise the use of medicines in acute hospital settings in Northern Ireland. I will compare and contrast the findings with the literature in Section 7.4. However in this section, I will provide a general reflection on some of the findings as an overview.

The grounded theory presented in this thesis addresses a gap in the literature in two key ways. First, as a theory, grounded in the data, it provides a multi-factorial explanation of how doctors, nurses and pharmacists optimise medicines in acute hospitals as opposed to solely considering inter-professional collaboration and communication. Second, it does so within the Northern Ireland context and so can be used to inform the current transformation in the health and social care agenda in the Province.

The study shows that there are differences between how each healthcare professional approaches and values the use of medicines. The influence of new non-medical prescribers on hierarchies, professional pride, inter-professional relationships and being able to make changes to prescriptions in real time showed how the practice, especially of pharmacists and nurses, has developed in acute hospitals in Northern Ireland.

My data demonstrated a high level of inter-professional dependency in the system. Both the most junior (FY1) and more senior doctors made decisions knowing that there were safe systems in place to catch any errors. This knowledge supported them when carrying out multiple tasks whilst working under pressure. Doctors' reliance on nurses and pharmacists to act as safety nets in catching prescribing errors is well-documented in the literature (Dornan *et al* 2009, Ashcroft *et al* 2015). However my study highlighted that nurses and pharmacists depend on having an accurate prescription to allow them to carry out their role. Whilst the literature described inter-professional communication being reliant on having a shared purpose, there is a paucity of references explicit to working with medicines. Having an accurate prescription also allows efficient use of nurses' and pharmacists' time. This data could suggest that professional roles and the overall system have been designed to manage risk through the adoption of professional standards and this ethos of inter-dependency. Such design may also reflect the traditional power relationships in acute healthcare (Benner 1984, Nugus *et al* 2010), with both nurses and pharmacists depending on and supporting doctors as part of their day-to-day practice.

The healthcare professionals in my study spoke about routinely and continually asking questions to clarify how medicines could be used safely. Participants gave a number of different reasons for this. Firstly, the use of multiple, often new, medicines required all participants to seek advice. Secondly, participants did not always have the most up-to-date information available about a patient or medicine when a decision was being made. Thirdly, doctors-in-training routinely prescribe medicines. This has been commented on by Dornan *et al* (2009). Doctors-in-training ask many questions in a learning capacity and the accuracy of their prescriptions are queried by nurses and pharmacists. Finally, some participants spoke about the rotational nature of junior medical and pharmacy staff not supporting the development of inter-professional trust and team-working as well as the effect which medical hierarchical relationships between doctors may have on patient care (Papoutsi *et al* 2017). This uncertainty, coupled with professional requirements to check prescriptions, meant that nurses and pharmacists in particular were not accepting prescriptions at face value, sometimes duplicating work. However this potential inefficiency helped to ensure that risk was managed and patients had a greater chance of getting the right medicines.

The central tenet of medicines optimisation is patient involvement. Some participants spoke of involving patients and their carers in both checking and choosing the right medicines. Others aspired to this if they had more time. There was one negative case, where a FY1 doctor told how she covertly involved patients after a ward round. Involving patients was self-reported, sometimes in response to an open question, and its accuracy cannot be confirmed due to the nature of the method used; however participants gave specific examples which rang true.

In looking at the system as a whole, participants spoke of traditional, new and overlapping roles in relation to medicines. These included the specific *checks and balances* needed in *managing risk*. They also highlighted a lack of trust of the accuracy of the prescription, with some believing that all colleagues did not respect the importance of taking care when using medicines. This is reflected in the literature (Dornan *et al* 2009). In an environment when roles,

such as prescribing, are changing, there is a need to make explicit the important roles of each healthcare professional in *managing risk* associated with medicines within the acute hospital eco-system. From my data, this supports effective team-working and ensures that current system checks are not changed. The development of new roles and practices will impact on the current balance of practice in both a positive and negative way and change must be managed thoughtfully with this in mind.

7.4 Linking findings to the literature

In this section I will provide an overview of the second literature review and link the findings of my research to the literature.

7.4.1 Overview of the second literature review

Grounded theory methodology necessitates revisiting the literature after the theory has been generated (Martin 2006). At that stage, I carried out a second, literature review, using a systematic approach. My literature search strategy is in Appendix 3 and a summary of the quality assessment of some of the key papers used is in Appendix 4. This second literature review had a new focus on *managing risk* and the conditions, strategies and consequences of the theory, as well as revisiting how healthcare professionals worked together in the prescribing and use of medicines.

I will compare my findings with the literature in Sections 7.4.2 – 7.5; however I have provided detail on a number of key studies in this section (7.4.1) and quality- assessed a larger number of key papers (Appendix 4) to demonstrate my skills in critically appraising the literature. I chose the studies below because they were current, well-designed and relevant to my work; the authors stated their aim and were clear about an appropriate choice of methodology, including sampling, data collection and analysis. All included a mechanism of quality assuring the results, either through using two

independent analysts or through team discussion, reaching consensus. I have included some professional standards and reports to situate my findings within this arena as I hope to use my work to influence managers and policy makers. I excluded systematic reviews, comments and editorials apart from seminal works by Reason (2000) and Vincent and Amalberti (2016).

The key studies used were conducted by different research groups predominantly in Australia and the United Kingdom. The Australian researchers (Manias *et al* 2014; Manias *et al* 2015; Rixon *et al* 2015; Liu *et al* 2016; Wilson *et al* 2016; Borrott *et al* 2017) focused on inter-professional communication and collaboration between doctors, nurses and pharmacists in acute hospitals. This field has developed from focusing on two healthcare professionals, usually in community settings as seen in my initial literature review, to having a focus on three healthcare professionals in secondary care. Researchers predominantly have used mixed-methods including observations and semi-structured, one-to-one interviews. This methodology provided both empirical data as well as more, in-depth descriptions of what was happening.

Manias *et al* (2014) reported that good, inter-professional, collaborative practice (IPCP) was essential to the processes contributing to the safe and effective use of medicines. Rixon *et al* (2015) particularly focused on how pharmacists communicated about medicines with doctors and nurses in specialist hospitals, using both observations and semi-structured interviews. They highlighted that these professionals worked separately on wards, coming together for specific short periods to solve a particular problem. Pharmacists tended not to communicate proactively, sometimes leaving notes for doctors on less urgent queries. Doctors and nurses would sooner have asked pharmacists for information on medicines than look for the information in the literature. They found minimal inter-professional working in fixed gatherings, such as ward rounds, due to all professionals not being present routinely.

Borrott *et al* (2017) carried out a qualitative study using ethnography to look at how doctors and nurses communicated about medicines in three acute paediatric wards in a tertiary children's hospital. Junior doctors and nurses used roundabout ways of communicating whilst their more senior colleagues had a direct communication style. Nurses tended to be more deferential to doctors, as reported in earlier studies. Doctors and nurses who had worked together over a period of time in static teams demonstrated well-defined ways of interacting, working proactively together to make medicines-related decisions. Borrott and colleagues discussed their findings within the context of identity theory, (Burke and Stets 2009), with each professional being seen to carry out their individual role. Nurses, in particular, asked questions to ensure that they met their professional requirement to administer medicines safely. Interruptions and problems out-of-hours were described in this study as in other studies (Dornan *et al* 2009, Seden *et al* 2013, Ashcroft *et al* 2015).

Wilson *et al* (2016) investigated newly qualified healthcare professionals' experiences of inter-professional, collaborative practice. They used thematic analysis of data from focus groups of newly qualified, practising doctors, nurses and pharmacists in tertiary hospitals. All participants lacked knowledge of what other professionals did and knew, although there was an understanding of the importance of appreciating and respecting each other's roles. This study reported some examples of good communication and teamwork, commenting that healthcare undergraduates needed to be exposed to colleagues from other professions to support working effectively in teams in their future careers.

All of these studies on inter-professional collaboration highlighted the complex nature of inter-professional interactions and the need for early training of undergraduate healthcare professionals together to facilitate effective inter-professional collaboration throughout their future careers.

Researchers in the United Kingdom (Dornan *et al* 2009, Seden *et al* 2013, Ryan *et al* 2014, Ashcroft *et al* 2015) predominantly focused on prescribing error rates in acute hospitals. Many of these studies were inter-related, either

by being part of larger study programmes such as EQUIP or PROTECT or as comparative work, to prove or disprove earlier theories (Seden *et al* 2013). Lewis and Tully (2009) also used grounded theory to demonstrate that junior doctors' prescribing was affected by more senior doctors and nurses. This study, using critical incident technique and one-to-one interviews, highlighted that junior doctors sometimes prescribed medicines which they were uncomfortable to prescribe in recognition of medical hierarchies or to maintain the status quo. Their decisions to do so seemed to be risk-based, believing that another prescriber would undo the decision later with little impact on themselves or the patient. Errors as a result of taking such an approach have been reported in subsequent studies (Dornan *et al* 2009, Ryan *et al* 2014, Ashcroft *et al* 2015).

In the EQUIP study, Dornan *et al* (2009) investigated the causes of prescribing errors by FY1 doctors in hospitals. This mixed-methods study resulted in at least two publications (Lewis *et al* 2009, Ashcroft *et al* 2015) although the full analysis is only available in report form (Dornan *et al* 2009). Findings were triangulated, with team discussion used to reach consensus. In their semi-structured interviews with thirty FY1 doctors about medication errors they had made, the authors defined error types according to Reason's model of accident causation (2000). This recognised tool is widely used in the literature. Breakdowns in communication also contributed to errors. Dornan *et al* stated that, "the single most important finding of this study was the complexity of the system within which prescribing errors were made" (2009:124).This study also showed that FY1 and FY2 doctors made at least twice as many prescribing errors as consultants and non-medical prescribers, when corrected for volume of prescriptions written. The limitations of this study were that it depended on participants being aware of and happy to share examples of medication errors.

A subsequent, similar study by Seden *et al* (2013) chose a sample size to allow comparison with Dornan *et al's* findings. The authors however analysed prescribing errors both for individual drugs and for whole Kardexes as this had been identified as a gap in the literature. They found that the amount of medicines prescribed per Kardex was the main indicator of prescribing

errors. In contrast to Dornan *et al*, these authors found no significant difference in rates of prescribing errors between different grades of doctors. They highlighted the importance of medication review by pharmacists to reduce errors reaching patients. Prescribing error rates were similar between the studies by Dornan *et al (2009)*, Seden *et al (2013)* and Ryan *et al* (2014).

Ryan *et al* (2014) carried out a mixed-methods study of the frequency and reasons for prescribing errors made by FY1 and FY2 doctors in acute hospitals in Scotland (PROTECT study). This study served to help the design of future training programmes for junior doctors. Like Dornan *et al*, these authors reported that there were multiple causes of prescribing errors, involving especially environmental conditions and collaborative working. They also found that FY1 and FY2 doctors had higher prescribing error rates than consultants (FY1s: 7.4%, FY2s: 8.6%, Consultants: 6.3%) but not twice the rate as reported by Dornan *et al*. Ryan *et al* also determined high levels of, "misplaced prescriber confidence" (2014:8), from responses to questionnaires and compared to error rates. They suggested that medical students should be taught the reasons for prescribing errors and how to avoid them in addition to current teaching on drugs. The overall prescribing error rates reported in these three papers were similar (9-10%).

Two studies focusing on healthcare systems in the English NHS (Dixon-Woods *et al* 2014 and Hignett *et al* 2018) also were of particular interest. Dixon-Woods and colleagues carried out a very large, mixed-methods study looking at, "culture and behaviour in the English National Health System." Whilst this study did not provide details of results due to the enormity of their data (available in a separate paper), it defined high-level themes to help healthcare organisations to provide safe, patient-centred care. These included understanding improvement through interacting directly with patients and staff; reducing the negative impact of environmental factors and low staffing levels as well as focusing on effective team-working; listening to staff and making sure they felt valued, and clear leadership. Hignett *et al's* paper (2018) entitled, More holes than cheese, sought healthcare professionals' examples of barriers to safe and effective health care in England. Data was collected from 330 questionnaires and subsequent focus groups at

workshops, for which participants self-selected to attend (n=135). Themes which evolved were complex and silo working, environmental pressures, ineffective communication and distractions.

In summary, a number of authors have researched specific elements of my theory, using a range of methods. Some have focused in general on how healthcare professionals worked together in acute hospitals, with others focusing specifically on how they worked with medicines. None have developed a wider grounded theory of how doctors, nurses and pharmacists work with medicines, which incorporates causal conditions, categories and strategies to inform future practice.

I have also included literature on specific theories such as Reason's model of accident causation (2000), specific texts describing High Reliability Organisations (HROs) (Weick and Sutcliffe 2001), improvement methodologies (Vincent and Amalberti 2016) and Hannawa *et al*'s work on understanding communication in healthcare (2017). These may not be founded on published primary literature, but are recognised as seminal papers within healthcare and wider afield. In particular, the literature on High Reliability Organisations has been built on case studies from the nuclear, oil and aviation industries. Lekka (2011:vii) commented that there is, "limited empirical knowledge regarding the extent to which HRO processes can be meaningfully applied to more mainstream organisations and contexts." The relevant details of these are included in the following sections.

I will contextualise the findings of my study with those from the literature by following the structure of the integrative diagram, for purposes of clarity (reproduced from Figure 5).

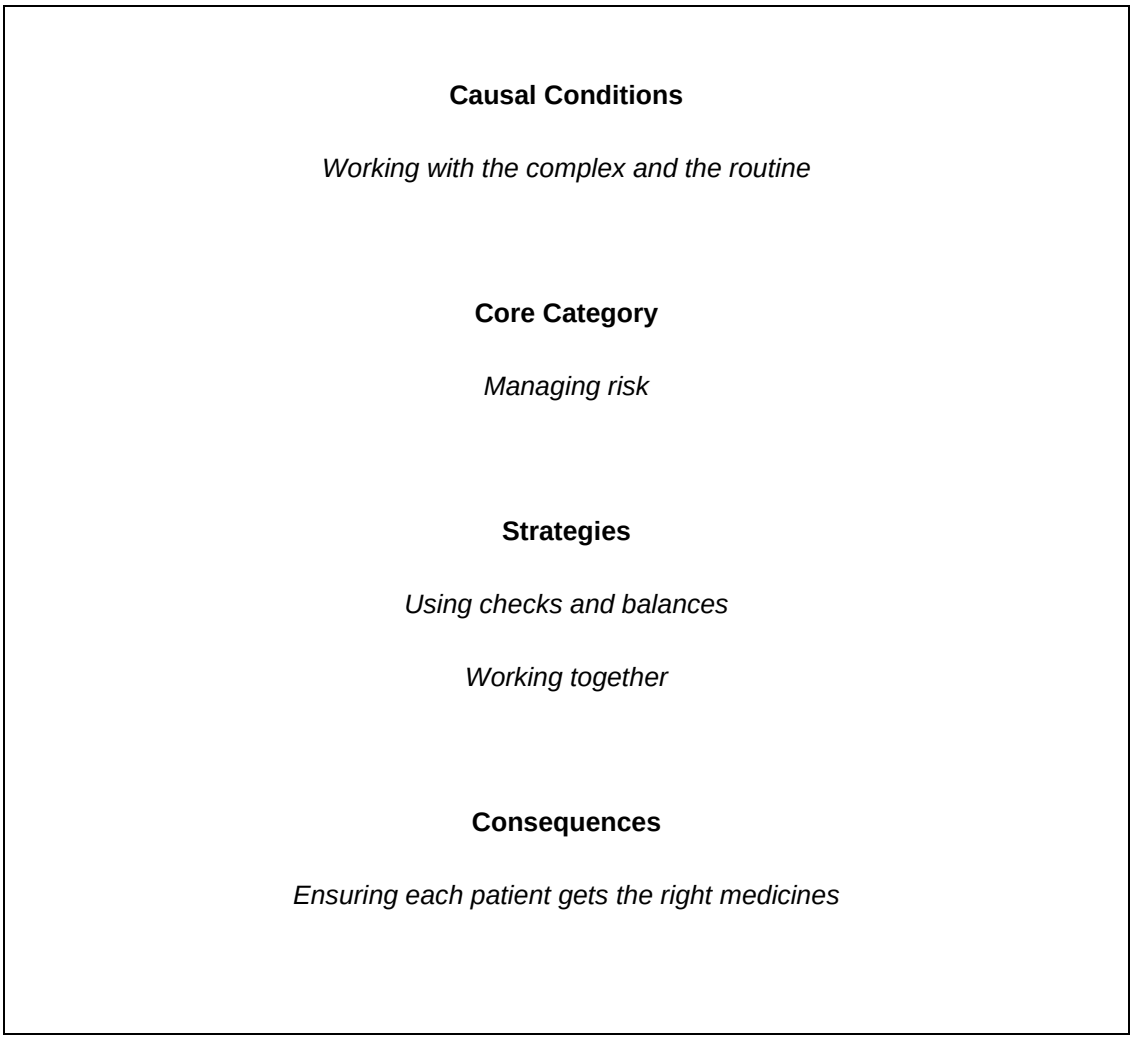


Figure 5: An integrative diagram giving an overview of the core category – managing risk

7.4.2 Working with the complex and the routine

There were four elements of the causal condition, *working with the complex and the routine - working in a complex system*, *doing routine work* [with medicines], *working under pressure* and *needing information*.

It was noteworthy that participants in my study spoke of both complex and routine medicines tasks contributing to the need to manage risk. Reason (2000) also found that both complex and mundane tasks that do not require higher-order thinking skills can cause errors.

The complexity of acute hospitals and patients with multiple co-morbidities on large numbers of medicines is described by many authors (Dixon-Woods *et al* 2014, Hignett *et al* 2018, Keers *et al* 2018). Dornan *et al* (2009) found that a complex environment in which doctors were unfamiliar with new ways of working, busy and under pressure contributed to prescribing errors. The doctors in that study described feeling overwhelmed with being asked to prescribe many unfamiliar medicines by nurses and blindly doing so to get the task done. Junior doctors spoke of adopting this approach, as well as being told what to prescribe by senior medical colleagues (Lewis and Tully 2009). They were unhappy but continued to do so. This was described by some of the FY1 doctors in my study also.

Reason (2000), in his paper on human error outlined two approaches – the person approach and the system approach. He used the term, “latent conditions”, to describe lack of staff, time pressures, inexperience, tiredness and unworkable procedures which lie hidden and later can lead to adverse events. He also categorised, “active failures.” These are unintentional and intentional errors, the latter happening for three main reasons - when individuals break the rules to save time (believing that they have the skills to do this safely), when the work environment makes it hard to follow the rules, for example, busyness, and breaking the rules for personal gain. A small number of the participants in my study made reference to practice which lies within the first two areas. One FY1 doctor spoke of prescribing medicines which they did not know, a further FY1 prescribed medicines for patients they did not see and a pharmacist did not carry out a full medicines review due to lack of time. No reference was made to breaking the rules for personal gain, although participants may not have been comfortable sharing such practice.

Vincent and Amalberti (2016), in their well-referenced and regarded book, Safer Healthcare, referred to the complexity of healthcare as being, “twenty different industries” (2016:33) with different specialties, types of work and groups of workers, some being more structured than others and excessive numbers of operating procedures. They recommended that a central suite of procedures which must be followed should be written for healthcare that would provide a level of consistency.

The medical staff in particular in my study described prescribing, using terms such as, “grunt work” and “monotonous”. These views were mirrored in the findings of Dornan *et al* (2009) in which some FY1 doctors referred to their prescribing as being tedious and boring, sometimes rushing through the task to get it finished. Dornan *et al* hypothesised that FY1 doctors found the prescribing that they did required a low level of skill and thought, which resulted in errors being made. Some prescribing tasks in Dornan *et al’s* study were seen as being run-of-the-mill, needing prescribers to pay attention to detail as opposed to making difficult decisions. My study found an almost hierarchical approach to prescribing with the more routine prescriptions being allocated to the most junior doctors. Therefore it could be argued that the mundanity of these tasks could have contributed substantially to the higher prescribing error rates in the prescriptions written by FY1 doctors described by some authors (Dornan *et al* 2009, Ryan *et al* 2014). In comparison, Seden *et al* (2013) did not report differences in prescribing error rates between different grades of doctors. Instead error rates were proportionally related to the number of medicines a patient had been prescribed. The authors of all of these studies identified multiple contributing factors to prescribing errors. Junior doctors in all of the aforementioned studies spoke of prescribing what their senior colleagues had told them. This may partly explain the difference between the prescribing error rates seen between studies.

Outside healthcare, in an early study describing errors in High Reliability Organisations such as the aviation industry, Weick and Sutcliffe (2001) in their seminal text, Managing the Unexpected, stated that air traffic control errors tended to occur more frequently during quieter periods. This was

because higher workloads resulted in air traffic controllers keeping on top of everything that was happening, being on a higher state of alert.

The feeling that they were *working under pressure* acted as a reminder to the participants in my study of the need to take care and adopt various strategies such as *using checks and balances* and seeking advice from colleagues to manage the risk of the situation.

In my study, having easy and timely access to accurate information about patients and medicines when making decisions was important to all the professionals interviewed. Participants reported that the absence of such information, especially when a patient is admitted to hospital, could result in tasks such as medicines administration rounds becoming more complicated and leading to medication errors. A lack of access to information was highlighted as a major contributing factor to medication errors in an older, prospective, cohort study of medication errors detected through interviews in two tertiary hospitals (Leape *et al* 1995). It was also listed as a contributor to errors in general by Ryan *et al* (2014) and Hignett *et al* (2018).

Some participants in my study described ready access to information on medicines using electronic solutions such as the Northern Ireland Electronic Care Record (ECR). However they also perceived this information as often being inaccurate, sometimes leading to prescription errors especially on admission. This undermined their trust in the reliability of the ECR. As with all such solutions, the data inputted must be accurate. Hannawa *et al* (2017) described how different risks can be introduced into healthcare if electronic solutions are not used appropriately.

In summary, the current literature shows that the safe use of medicines in acute hospitals is influenced by many factors including high patient numbers, high use of often complex medicines in an environment with underlying risks, such as inadequate systems design, time pressures and insufficient skilled staff and accurate information. Prescribing is identified by doctors as being a mundane task. The literature reflects the causal condition in my study, *working with the complex and the routine*, contributing to the validity of my study.

7.4.3 Managing risk

One of my initial research questions was:

- How do individual healthcare professionals define their role with medicines?

This is addressed in the discussion of *managing risk* in this section and also of the strategies *using checks and balances* and *working together* in later sections.

Managing risk is the core category of this grounded theory. It is central to what is happening when doctors, nurses and pharmacists work with medicines in acute hospital settings in Northern Ireland.

The need to manage risk came from *working with the complex and the routine*. In my study, the participants described a continual, underlying tension and questioning surrounding the use of medicines. The extent of this does not appear to be reflected in the current literature although in *managing risk,* all participants were following professional guidance. All participants described asking questions if they were not sure. Nurses spoke of their professional obligation to ensure that they were administering the right medicine, irrespective of what others had said. This is highlighted in the Nursing and Midwifery Council's Medicines Management Standards (2007) and also is a finding in the ethnographic study on communication about medicines between nurses and doctors conducted by Borrott *et al* (2017). Pharmacists worked to a constant narrative of *managing risk* through problem-solving and constantly asking questions. To manage risk is standard 2.2 in the Pharmaceutical Society of Northern Ireland's Code (2016). Doctors in my study sought information on which to make prescribing decisions. The General Medical Council's good practice document on prescribing and medicines management and devices (2013) requires doctors to seek advice from colleagues if they are unsure about aspects of prescribing. Asking constant questions and not trusting the information available or colleagues, having a "preoccupation with failure" could be seen as a duplication of work but also could be indicative of a safety culture (Weick and Sutcliffe 2001).

This constant awareness and anticipation of possible errors was reflected in the general literature on High Reliability Organisations (HROs). A High Reliability Organisation is one which, “operates under very trying conditions all the time and yet manages to have fewer than their fair share of accidents” (Weick and Sutcliffe 2001). These authors described HROs as having a focus on changing organisational culture as well as, “collective mindfulness and collective enactment”, the impact that people have on how others behave. Learning in this area has come from studies of disasters in the nuclear, space and aviation industries but a lot of the literature is in narrative form. Urlings and Nijhuis (1988) looked at construction workers’ views of safety and found that when safety had to compete with production, then there was a reduced focus on safe working. This was not described by the participants in my study. Weick and Sutcliffe (2001) described staff in HROs as constantly being aware of the potential for making errors and therefore continually making small changes to ensure reliability. Yip and Farmer (2015) described the importance of being preoccupied with failure and the possibility of failure as underpinning safety in HROs. Such an approach was described by all participants in my study.

Weick and Sutcliffe (2001) identified a number of factors contributing to HROs. From my study, there was an indication that a number of these were in place in acute hospitals in Northern Ireland. They included being continually aware of what is happening so that risks can be managed, respecting expertise, carrying out audits, reporting and learning from incidents and a focus on training, with pharmacists in particular having a preoccupation with failure. However other factors such as ability to abandon work on safety grounds and for nurses, having a fair-blame culture, were absent.

Weick commented that HROs continuously changed how they did things and had a, “chronic suspicion” of the potential for small errors potentially having big consequences (1987:119). Reason (2000) stated that, “safety is preserved by timely, human adjustments” (2000:770) with control changing from being of a hierarchical nature to being in the hands of an individual worker at times of high stress. Predominantly the nurses and pharmacists in

my study described continually, flexing up to manage individual risks associated with medicines and through not trusting the Kardex, anticipated the worst.

The variation in the application of strategies to reduce harm from medicines has led to the World Health Organisation recently identifying, “Medication without Harm” as its theme for the third global patient safety challenge (2017). This has been described as a change programme to reduce risk and improve the safe use of medicines. Its goal is to reduce the level of severe, avoidable harm related to medications by 50% over five years globally. Three early priorities have been identified for action. These are using medicines in high-risk situations, polypharmacy and at transitions of care. In my study, participants spoke of *using checks and balances* in all three of these areas – focusing on the use of critical medicines, reviewing medicines and de-prescribing when a patient had an acute kidney injury or was taking multiple medicines and also focusing on getting medicines right, especially on admission and discharge.

The medicines administration round on the hospital ward has been shown to be a high risk process in healthcare. Nurses in my study described interruptions as being commonplace, sometimes contributing to errors in the workplace. A number of studies have evaluated the numbers and causes of medication administration errors made by nurses (Walker and Lowe 1998; Deans 2005; Keers *et al* 2018). Nurses tended to only report medication errors which had a negative impact on patient care (Walker and Lowe 1998), with fear of retribution and self-preservation being cited as the main reasons for not reporting all such errors. However this selective reporting was not seen in the anonymous self-report study carried out by Deans (2005) at a major Australian regional hospital (n=154). Contributory factors to medication administration errors have been reported as: poor communication, human factors such as stress and fatigue of nurses, a variety of distractions, confusing the names of medicines and patients, and handwriting errors (Phillips *et al* 2001; Mayo and Ducan 2004). High-risk industries, such as aviation and nuclear power, protect such high-risk tasks by making sure they are carried out by highly competent individuals and are

protected from interruptions (Weick and Sutcliffe 2001). The nurses in my study described attempts to protect a specific nurse to administer medicines, but this was not always successful.

Administering a medication at the wrong time has been reported as one of the main types of such errors (Deans 2005). Walker and Lowe (1998) found that delayed doses could be viewed as routine practice by nurses as time often had to be devoted to making sure the prescription was correct or legible. This view of normality may explain why the National Patient Safety Agency had to issue guidance on the importance of administering critical medicines on time (NPSA 2010) and also the ongoing focus of the Department of Health in Northern Ireland on missed doses. The reasons for missed doses are multifactorial but underline the importance of all healthcare professionals working together to reduce the incidence of medication errors.

In Deans' (2005) study, nurses sought advice from colleagues when administering medicines. They also highlighted that they would have liked to spend more time with patients when giving out medicines. Nurses in my study reported having more time than previously to spend with patients as a result of the pharmacy-led integrated medicines management service on the ward where this existed.

The many factors which caused prescribing errors described by Ashcroft *et al* (2015) indicated that a variety of different approaches is needed by all the healthcare professionals involved in using medicines. The complexity of *managing risk* and improving patient safety with respect to the use of medicines therefore has been recognised by both the Department of Health and healthcare managers, with a need for a multi-pronged, systemic and systematic approach and it is unsurprising that it is central to the work of participants in my study.

Having *managing risk* as the core category initially surprised me as it seemed to be a pragmatic approach as opposed to a values-based approach to providing person-centred care. However this did not seem to surprise other researchers to whom I had presented my findings, especially those who had recent personal experience of healthcare. *Managing risk* does not seem to be

a role which would encourage individuals to follow a career in healthcare however by adopting this approach, the participants in my study described strategies which led to each patient getting the right medicines.

7.4.4 Using checks and balances

In my study, the strategy *using checks and balances* describes both individual and systemic approaches to *managing risk* associated with medicines.

Participants used different *checks and balances* in their day-to-day role. These included specific checking and control mechanisms, for example, reviewing prescriptions regularly and making the best use of resources.

Another of my initial research questions was:

- Do healthcare professionals work to optimise the use of medicines?

Using checks and balances, which includes encouraging some patients to be involved in decisions about their medicines, could be argued as having the aim of improving patient outcomes. Participants in my study described this as a work in progress, with healthcare professionals striving to optimise medicines use. This will be reinforced in the discussion below.

Reviewing prescriptions regularly, preferably every day, was described in my study as being a core *check and balance* especially within the dynamic nature of illness. For doctors, this was usually carried out by a senior doctor as part of a wider patient review. Decisions were made to stop or start medicines, sometimes without sufficient information and sometimes an informed analysis of risk versus benefit was required. This was difficult for inexperienced FY1doctors and Dornan *et al* (2009) described their inability to be able to, “frame their prescribing decision,” as being a contributing factor to prescribing errors. Higgins and Tully (2005), in their qualitative study of the, “schemas” which hospital doctors used to prescribe, highlighted differences in approach to prescribing between different grades of doctors. Nurses

reviewed prescriptions each time they administered a medicine or discussed medicines with patients. They (as well as pharmacists) used their wider experience of the healthcare system and of the use of medicines to examine the consequences of each prescription. Pharmacists described reviewing medicines especially as part of the medicines reconciliation process on admission and discharge – checking they were accurate, appropriate and filling in any gaps (either as a pharmacist prescriber or by asking the junior doctor to change the prescription). The benefits of pharmacists' medicines' review, as part of a wider, multi-factorial approach to managing medicines, was described by Scullin *et al* (2007; Scullin *et al* 2011). Seden *et al* (2013) highlighted the importance of routine medication review by pharmacists. Ontade and Quaye (2018), in an observational study of pharmacist medicines reconciliations (n=864), reported a benefit: cost ratio of 5:1 to 11:1. This is higher than the benefit: cost ratio of a full pharmacy integrated medicines management service of 4:1 as reported by Scullin *et al* (2007).

Most participants in my study involved patients or carers in making decisions about their medicines or in getting accurate information to check how the patient used their medicines on a day-to-day basis. Higgins and Tully (2005) reported FY2s becoming more aware of the need to involve patients when prescribing. Doctors, in my study, spoke of specifically asking pharmacists to give patients information about their medicines. This was reported also by Manias *et al* (2014). They interviewed patients, carers, doctors, nurses and pharmacists to determine what factors facilitated or acted as obstacles to including patients in using medicines in specialty hospitals in Australia. Whilst the authors commented that healthcare professionals should develop their communication skills as well as engage with patients and carers about their medicines, they did not find that patients were involved as an additional check in the system. Hsiros and Thompson (2013) also used semi-structured interviews with patients, carers and a range of healthcare professionals in two English hospitals to determine whether involving patients in their general care helped to improve patient safety. Patients and professionals welcomed greater involvement, "feeling more part of things" (2013:4). Concerns were raised by both staff and patients relating to whether querying care may seem

inappropriate or may annoy professionals, negatively impacting on care. Having a defined approach which patients and carers could agree upon was suggested. Macdonald *et al* (2014) developed a grounded theory of how patients in hospital were involved in medicines administration. Interviews were carried out with patients and nurses. “Confirming Delivery” (2014:539) was the core category, with patients being involved, not being well enough or not becoming involved during the administration of their medicines as they perceived that nurses were too busy. The authors described this work as contributing to future design of medicines management systems to support greater patient involvement.

Vincent and Amalberti (2016) discussed the importance of seeing safety “through the patient’s eyes”. Higgins and Tully (2005) observed that consultants in their study made prescribing decisions within the context of each patient and therefore believed that patients should be fully-involved in prescribing decisions. It should be noted that that study pre-dated recommendations to use a medicines optimisation approach. Vincent and Amalberti also outlined the need to change the focus from identifying a patient’s individual incidents to looking at the longer trajectory of a patient’s care and the wider implications of medication incidents. Closer integration of care services in Northern Ireland, one of the objectives of Bengoa *et al* (2016) will provide an opportunity to take this wider view and identify opportunities to improve patient care which could otherwise be missed. Therefore there is a need to teach all healthcare professionals to make decisions about medicines within the longer trajectory of a patient’s illness, reviewing medicines in the knowledge of all the implications of change.

In my study, some of the medical staff described feeling empowered through their experience of clinical audit to query prescribing decisions taken by colleagues in a supportive way. Actively encouraging staff and patients to ask challenging questions is seen as an integral part of an effective safety culture (Hannawa *et al* 2017), an effective *check and balance*.

Having experienced professionals making effective decisions was another *check and balance*. Pharmacists and more senior doctors in my study often

made decisions about the use of medicines by going back to first principles. They used higher-order decision-making skills. The need for such high-level thinking and reflection was highlighted by Donald Schon (1983) when writing about the need to employ professionals as opposed to technicians when working with 'messy' situations, where there was not always a right answer.

The less-experienced FY1 doctors in my study made decisions using different *checks and balances* than their more experienced colleagues. They prescribed limited ranges of drugs and made risk-based decisions based on whether they were transcribing a drug or prescribing it de novo. These junior doctors described sometimes signing prescriptions which they had transcribed, perhaps not knowing the medicines or the patient. This approach was described by Dornan *et al* (2009) and also by Wilson *et al* (2016), where one doctor commented that junior doctors were often just used for their signature. Dornan *et al* described decisions made by FY1 doctors as being, in their eyes, "good enough".

Higgins and Tully (2005), in their qualitative study using in-depth interviews, outlined how junior doctors and consultants made prescribing decisions, "within some form of schema" (2005:190). FY2s identified that they needed to widen the schemas which they currently used, described by the authors as, "some sort of conscious vigilance or reappraisal was now necessary." They reported a development in the complexity of the schemas used by doctors as they gained experience.

In my study, one FY1 doctor would have liked to be given advice or tips about how medicines were used in a new clinical area when starting to work there. She described making errors because she had carried her prescribing practice her previous post. Junior doctors who participated in the EQUIP study (Dornan *et al* 2009) reported making errors because they had brought their different previous prescribing practice to a new job, for example, prescribing analgesics. Provision of a card with medication pointers for doctors who were new to an intensive care unit was described in Rixon *et al* (2015); however no evidence of the practical use of this information card was

seen in practice. There may be benefits however in making the norms of working on each ward explicit to new team members.

Nurses use structured *checks and balances* as highlighted both in my study and the nursing literature (Borrott *et al* 2017, Bryant *et al* 2018). In my study, nurses were the only professional group who described routinely using standard checking tools, such as the Five Rights. They described following Trust checking policies such as checking the patient's name and wristband before administering a medicine. Nurses also asked pharmacists for advice if they were unsure of a dose and involved patients in their checking processes. Nurses were described by medical staff as keeping them safe and on the right road. Again this is reflected in the literature on inter-professional collaboration (Wilson *et al* 2016). Eisenhauer *et al* (2007) published a paper on what nurses reported thinking when they administered medicines. They carried out retrospective, semi-structured interviews with 40 nurses as well as recording information in real time. Checking when administering a medicine was the third highest reported thought reported by nurses. This included checking that the drug was correct and appropriate, when the dose was next due and most frequently, where to find the drug. The professionalism of nurses was summarised by one nurse in this study who, when commenting on the Five Rights checking process said, "the sixth R is the Registered Nurse who makes sure the previous five R's are correct" (2007:87).

Nurses in my study appeared to use deeper thought processes by looking at the implications of prescribing decisions as opposed to the appropriateness of the initial decision. This was reflected in the grounded theory produced by Dickson and Flynn (2012). The authors carried out 50 semi-structured, in-depth interviews of nurses to determine a grounded theory on what nurses thought and did when they came across a medication error and how these impacted on patient outcomes. They reported a general "theme" of "clinical reasoning" with two "safety processes," of, "maintaining medication safety" and, "managing the clinical environment" (2012: 6). Dickson and Flynn (2012) gave further detail on strategies used by the nurses in their study, many of which reflected the actions highlighted by the nurses in my study. These

included, taking the patient's wider clinical condition into account, linking with doctors regarding a patient's care (including building rapport with doctors and communicating well), linking with nursing and other colleagues (many of whom had expert knowledge) and minimising distractions and interruptions.

Nurses' double-checking systems for medicines were not always seen as a failsafe way to reduce risk in my study, as even during the checking process, nurses could lose concentration. The literature on the value of double-checking medicines administration is mixed and there is uncertainty of whether any benefits are outweighed by the additional resources needed to do this effectively (Alsulami *et al* 2013; Hewitt *et al* 2016).

Pharmacists did not overtly speak about specifically *using checks and balances*, apart from reconciling medicines (NICE 2015) when patients moved across interfaces of care. Having a deeper knowledge and understanding of a patient's medicines seemed to be core and also unique to the pharmacist's role. This was also highlighted by Rixon *et al* (2015) who showed a difference between doctors and pharmacists in their knowledge of how individual patients took their medicines. This was due to the pharmacist having carried out a structured, medicines reconciliation on admission which showed gaps in the doctor's medication history. Pharmacists then, "filled in the gaps", which was a role of pharmacists and nurses described by all participants in my study. Rixon *et al* also highlighted that the medication review carried out by a pharmacist, incorporated a wider and deeper look at the available patient information when compared to a doctor's approach, for example, noting renal function. This was also described by the participants in my study.

Rixon *et al* (2015) developed this theme of medicines' focus seen in pharmacists by commenting on the huge importance that pharmacists placed on medicines in comparison to doctors and nurses. They gave examples of doctors not prioritising medicines which could contribute to errors and missed doses. Ryan *et al* (2014) looked at the frequency of and reasons for trainee doctors' prescribing errors, collecting data through interviews and questionnaires. Participants again commented that trainee doctors saw

prescribing as a task of low priority. The participants in my study had different values relating to their use of medicines. Despite medicines being described as one of the few things they could change in caring for patients, the doctors in my study did not specifically prioritise medicines when compared to the approach taken by nurses and pharmacists. Some nurses spoke with passion of the importance of medicines but in the context of their professional practice and the patient. One pharmacist's comment, "we are all about medicines" summed up the all-consuming importance that medicines obviously had for this professional group. Therefore in my study doctors, nurses and pharmacists carried out different roles with and it could be argued, had different value systems, assigning different levels of importance to optimising medicines in their practice. These differences between professionals may continue to grow as more healthcare professionals work directly with medicines as seen in the physiotherapist's further different approach in my study.

Pharmacists were described by my participants as being, in themselves, *checks and balances* in the system. They checked prescriptions, provided advice, solved problems, fixed incorrect prescriptions and facilitated safe and timely discharge. Scullin *et al* (2007) randomly assigned patients in an acute hospital in Northern Ireland to receive either an enhanced, "integrated medicines management" (IMM) service (n=371) or the usual medicines management service (n= 391). The enhanced service involved a ward-based clinical pharmacist and pharmacy technician having input throughout a patient's hospital admission, specifically reviewing medicines on admission, during the inpatient stay and linking with primary care at discharge. Patients were followed up for 12 months post-discharge. The primary outcome of this study was that the mean length of stay for patients who received the IMM service (p=0.003) was reduced by 2 days. This group also had a reduced readmission rate over the following 12 months as well as longer time to readmission compared to the patients who received the usual service. The authors reproduced this service in a second hospital with similar outcomes (Scullin *et al* 2011). Miller *et al* (2016) also showed that Consultant Pharmacist-led medicines review and case management of older people

improved medication appropriateness, contributed to reducing 30 and 90 day readmission rates and made cash and non-cash-releasing efficiencies.

Using checks and balances in my study also involved making the best use of resources. This included making the best use of time by assessing risks, making decisions, prioritising tasks and implementing new ways of working. It appeared that the members of each profession did not necessarily assess risks associated with medicines in the same way. This may be due, in part, to the lower priority given to medicines by doctors as described by Rixon *et al* (2015). Doctors and pharmacists in particular, in my study, spoke about making decisions by assessing the relative risk of the tasks which they had to carry out and then prioritising. Doctors were more used to making decisions, looking at the evidence-base in conjunction with patient factors and making, often, complex decisions. This was also reported by Higgins and Tully (2005). Senior medical staff seemed to be able to make risk-assessed decisions and move on to the next task. Some junior medical staff also risk-assessed prescribing tasks and prescribed drugs which they were not familiar with but on the balance of probability believed that little harm would come from the decision. All medical participants made prescribing decisions, confident that other members of the team were there to pick up on errors – an additional check in the system.

Pharmacists in my study described being risk-aware as a result of their training, with more junior pharmacists needing reassurance that their questions were valid and growing in confidence as they developed ward-based skills. Nurses were cautious about making decisions when they lacked knowledge, from both a patient care and personal professional perspective.

Illing *et al* (2008) in their report for the General Medical Council on how prepared medical graduates are to begin practice, showed that two of the areas which junior doctors felt least prepared for were prescribing and prioritising tasks. This led to a recommendation that final year medical students should spend at least a week shadowing junior doctors. There have also been studies which showed the benefits of simulated teaching methods in helping medical trainees to prioritise (McGlynn *et al* 2012). These students

benefitted most from being given total responsibility for carrying out tasks and getting individual feedback.

The nurses and pharmacists in particular in my study, described implementing new ways of working, developing new professional roles to help in *managing risk* and improving the quality of patient care. These included having ward-based clinical pharmacists and technicians -an integrated medicines management approach (Scullin *et al* 2007; Scullin *et al* 2011), independent prescribers (Abuzour *et al* 2018) and specialist roles such as consultant pharmacists (Miller *et al* 2016) and specialist nurses (Royal College of Nursing 2014). Gregory and Austin (2016) commented that current trends towards inter-professional working and new scopes of practice have led to tensions over professional boundaries, with the importance of protecting professional boundaries described as defining a profession. Professional tensions were not described by the participants in my study, with doctors in particular supporting the further development particularly of pharmacist prescribers.

There was support for the development of other, new professional roles in my study in which nurses and pharmacists described proactively engaging in change and taking on new roles. In this way they were adding additional *checks and balances* into the system to help with *managing risk.* This ability to develop practice however was not reported by Penm *et al*(2017) in which 85% of Canadian pharmacists surveyed described facing challenges when trying to develop their professional role due to workplace culture and time constraints. These differences may reflect the passage of time, having a greater service need to develop such roles and the size of Northern Ireland which could be an enabler of new ways of working. However, there are implications for all three professional groups of professionals in relinquishing their traditional roles to take on what are viewed as much-needed, new responsibilities. Such change needs strategic oversight to support these developments within the context of maintaining safe services. Current hospital medicines systems have embedded the traditional roles of nurses and pharmacists in professionally checking prescriptions into their “design.”

The benefits of non-medical prescribing in providing safer, more efficient and timely care were described by the nurses, pharmacists and senior doctors in my study. Nurses described being more cautious than doctors in their approach to prescribing but less cautious in certain instances than pharmacists. Nurses seemed to prescribe new drugs in line with guidelines whereas the pharmacists tended not to prescribe de novo but use their prescribing skills to stop short- term treatments and correct inaccuracies in prescriptions. Dornan el at (2009) and Ashcroft *et al* (2015) stated that the accuracy of pharmacist and nurse prescribers was similar to that of consultant medical staff with the pharmacists involved in the earlier study making no prescribing errors. Error rates reported reflected the number of prescriptions written. One participant in my study, who was a non-medical prescriber, commented that perhaps non-medical prescribers (NMPs) who are meticulous in their approach and almost reverent of being able to prescribe, will lose this focus as time passes- just as she believed doctors did currently. I also wonder if the NMPs of today are accurate and safe because of their broad background in nursing and pharmacy and knowledge of the pitfalls of prescribing. The NMPs in ten years' time, who will have been trained differently perhaps, may have less focus on being safe prescribers. This is an area for future research.

Specialist nursing and pharmacist practice was also described by participants as being an additional *check and balance*, adding resilience to the medicines system. Examples of this practice given in my study were Diabetic Nurse Specialists and Consultant Pharmacists for Older People. Whilst it seems logical to deduce that having expert practitioners working at a strategic level within a clinical setting would make a difference to patient outcomes, little research has been carried out on the benefits of having specialist nurses (Royal College of Nursing 2014) or consultant pharmacists. Miller *et al*, in their work with consultant pharmacists in older people (n=355) in Northern Ireland concluded that, consultant pharmacist case management resulted in both cost savings and more appropriate prescribing with safer, seamless and more person-centred care (2016: 46).

The need for *checks and balances* such as uniformity and a more managed system, as seen in high performing industries described by Vincent and Amalberti (2016) contributed to effective risk management. Such change would rely on cultural and hierarchical shifts. The need for this was described also by Dornan *et al* (2009). The participants in my study described a less hierarchical model of healthcare which they seemed to embrace. Pharmacists in particular had a recognised role in managing medicines risk and the central role of nurses in managing the whole picture and knowing patients was described by all.

An aspirational *check and balance* referred to in my study was the use of electronic prescribing. This is designed to limit the discretion of workers and reduce worker autonomy by having decision support mechanisms and rules-based prescribing.

7.4.5 Working together

The last of my initial research questions was:

- What is each healthcare professional's contribution to working in a team to optimise medicines use and why do they work in this way?

The answer to this is reflected in the strategy *working together*.

The participants in my study spoke about *working together* which included a number of sub-categories - working in teams, having multi-professional interdependencies and communicating well with each other. They described how they each brought a profession-specific approach to using medicines in patient care as well as potentially having some overlapping roles with other healthcare colleagues. Professionals *working together* did not necessarily mean team-working although some participants in my study, mainly nurses and pharmacists, spoke of belonging to and working as a member of at least one team.

Each professional spoke differently about *working together* in my study. Nurses were keen to say that everyone worked well together whereas pharmacists described almost having to earn their role on the ward-based team. Doctors spoke of the benefits of working with and listening to the multidisciplinary team but did not describe themselves as being a member or leader of such a team. FY1 doctors spoke of their working with different teams but again did not refer to themselves as members. This may have been because of the rotational nature of their posts. Weller *et al* (2011) reported that junior nurses and doctors "primarily" related to working within a team of their own professional group (2011:480). In this qualitative study, they interviewed 25 junior doctors and nurses about how they worked together and analysed their data using a pre-determined coding framework based on the literature on team-working. One senior doctor in my study spoke of being part of a regional multidisciplinary team which brought together specialists to make an informed decision and manage risk when making decisions about complex treatment regimens. Such regional networking was recommended by Sir Bruce Keogh (2013a) in his Review into the quality of care and treatment provided by 14 hospital trusts in England, commissioned in response to the Mid Staffordshire Public Inquiry.

Working together was seen as being important to all the participants in my study. Spence Laschinger *et al* (2001) in a cross-sectional study of 3,016 nurses (representative of the nurses on the register) in Canada, using validated instruments, found that having good relationships with physicians, as well as having a sense of autonomy and control, contributed to nurses' job satisfaction and the, "perceived quality of patient care" (2001:209). Estabrooks *et al* (2005) used multilevel analysis in a cross-sectional study where patient outcome data (n= 18,142) were compared against hospital nursing data from a survey of nursing characteristics. They reported that good relationships between doctors and nurses were factors that improved 30 day mortality in acute hospitals in Canada. Weller *et al* (2011) reported that whilst junior nurses and doctors recognised the importance of team-work to patient safety, lack of team leadership as well as, "communicating but not

particularly working together that well" (2011:481) did not facilitate inter-professional working.

Achieving effective team-working in acute hospitals is challenging due especially to the transient nature of doctors-in-training and pharmacists who move routinely between wards as well as hospital geography and outlying patients. Lewin and Reeves (2011) carried out an ethnographic study in which they used periodic (2-3 month) observations on two medical wards and semi-structured interviews with healthcare professionals over a two year period to explore how inter-professional interactions differed to Sinclair and Goffman's "'models of front and backstage working." They went as far as to say that teamwork may not be relevant in acute medicine because of, "loose, short-lived configurations of professionals" (2011: 1599). Wilson *et al* (2016) described how challenging it was to measure the benefits of *working together* on safer patient care due to the many variables in the working environment which were described as, the speed of change in ways of working, the frequent turnover of team members and the "fluidity"' of ways of working. In my study, nurses and more senior pharmacists were the static members of a team, providing a level of stability and organisational memory as well as supporting newer trainees. FY1 doctors valued this support.

My participants spoke of *working together* on a multi-professional ward round or at a morning ward meeting which helped more-informed decisions to be made in real time, as well as the prioritisation of tasks in the context of a wider treatment plan. However outside such formal settings, they carried out their work individually, approaching colleagues with specific questions. This "silo-working" of all healthcare professionals has been described by a number of authors. Milne *et al* (2015) in an ethnographic study of junior doctors' capacities to practice inter-professionally in three teaching hospitals in Australia stated that junior doctors worked in isolation except when they were on ward-rounds or "bumped into people" from time to time. These authors described little interaction or communication between doctors, nurses and other professionals on the ward, with middle-grade doctors communicating only with other medical staff and focusing on finishing a

specific task. They described the behaviours seen as occasionally bordering on disrespect for other healthcare professionals.

Rixon *et al* studied inter-professional communication (2015). This study involved semi-structured interviews and observations with 21 pharmacists, doctors and nurses in a large, acute teaching hospital in Australia. Their focus was on pharmacists' communication with other healthcare professionals about medicines. Their thematic analysis showed that collaborative practice relating to medicines use was not achieved as each professional had their own specific responsibility for certain medicines-related tasks with the doctor having overall responsibility for deciding which medicine to use.

In contrast, the aforementioned observational study by Lewin and Reeves (2011) found that planned, multidisciplinary team meetings and ward rounds, established to support collaborative working between healthcare professionals, were mainly "ritualistic," providing a cover to patients and others that staff are working openly as a team, with most communication happening informally and out of sight. The authors reported that this, "backstage working" was used to overcome ineffective, "frontstage working", for example on ward rounds, which the authors linked mainly to problems with communicating with doctors. Whatever the limitations of formal and informal interaction and communication, the benefits of being physically based on a ward seemed to help inter-professional collaboration.

In my study, I interviewed four individual professionals who worked together on a very busy acute medical ward. They described their relatively stable, multi-professional team, whose members had not changed substantially over the last year. They specifically described working well together, "having each other's backs" and not being afraid to seek clarification or ask questions about medicines. They spoke about depending on each other to do their role well and described looking out for each other.

The differences between different professions' cultures, knowledge and values have been reported as contributing to poor team-working. In their qualitative study, Rydenfalt *et al* (2011) carried out semi-structured interviews

with 18 doctors and nurses who worked in operating theatres using a visualisation technique. They reported that different professional views and objectives were barriers to effective team-working. They reported that this was due to a, “lack of mediating rules (social relations, norms and conventions) that supported interaction between team members” (2011:792).

Two pharmacists in my study believed that junior pharmacists rotated too frequently between clinical teams to allow them both to learn effectively and be recognised and trusted by consultant colleagues. A recent study by Bryant *et al* (2018) compared nurses’ perceptions of two different models of clinical pharmacy practice, ward-based (where a pharmacist was based on one ward and saw all the patients there) and team-based (where pharmacists travelled between wards seeing only the patients being cared for by one clinical team or specialty). Their study was carried out in acute medical and surgical wards in Australia, using a mixed-methods approach. Team-based pharmacists were able to carry out more medicines reconciliations and potentially reduce medication errors. Nurses however reported disadvantages of team-based pharmacists. These included nurses having to spend more time chasing medical staff to clarify prescriptions, reduced information written by pharmacists on patients’ Kardexes to support medicines administration, reduced accessibility of pharmacists and a negative impact on pharmacist-nurse relationships. The authors suggested that ward-based pharmacists helped nurses to, “overcome the authority gradient” or gap in expertise in medicines between nurses and doctors (2018:95). This way of working was reinforced by some of the nurses in my study who waited for the pharmacist to resolve medicines queries, using them as an initial sounding board to test out the validity of the query.

Some pharmacists in my study described being members of both the pharmacy and the ward-based clinical team, with a preference of being seen as ward-team members. They had to work to develop relationships at ward level, describing the importance of being on the ward and other healthcare professionals coming to them to ask questions. Their accounts suggest that they almost had to, “seek approval” to belong to the multi-professional, clinical team, although they felt welcomed on the ward from the outset. This

has been described in other studies (Makowsky *et al* 2009). Rixon *et al* (2015) observed that pharmacists tended to work as sole practitioners alongside other healthcare professionals as opposed to being integrated into the clinical team with most communication happening informally. In their study, pharmacists rarely were part of formal opportunities to discuss medicines use, for example, on ward rounds. This contrasted with my study, in which pharmacists spoke about their active and integrated involvement in ward rounds and the associated benefits of this approach in allowing them to prioritise their work. One junior pharmacist in my study did describe coming along after the ward round to review Kardexes, usually due to competing priorities. Two doctors in my study initially had to get used to having a ward-based pharmacist question their prescribing but now spoke of being lost without one. This was also reported by Makowsky *et al* (2009). Being a member of the clinical team did not seem to detract from the pharmacists in my study meeting their professional obligation to do the right thing, for example, report medication incidents. Overall, pharmacists in my study highlighted greater integration into the clinical team than reported in other studies. This may be due to the pharmacist's role being better defined than in the past, some of the pharmacists being experienced practitioners who were able to prescribe and the benefits of the pharmacist to the smooth running of the ward, which were described by all participants.

Understanding the roles of other healthcare professionals has been cited by a number of authors as being important to effective inter-professional collaboration (Makowsky *et al* 2009, Makowsky *et al* 2013). Pharmacists in my study felt that others did not understand the complexity of their work and this sometimes resulted in others having unrealistic expectations of timescales. Makowsky *et al* (2009), albeit in an older study, carried out a multi-centre, controlled clinical trial of team-based pharmacist care in hospitalised medical patients. They collected data from interviews and reflective journals using a phenomenological approach to identify themes. A clinical pharmacist was introduced to the multi-professional team. The pharmacists in that study found that they had to explain their role especially to family doctors on the team. Doctors and nurses however learned about the

pharmacist's skills and knowledge. In a later study, Makowsky *et al* (2013) conducted an online survey of doctors who had worked with pharmacists at ward level, using a validated questionnaire. Response rates were described as, "low but typical." (2013:125). Results showed high scores from doctors for collaborative working relationships with pharmacists, suggesting that they respected team-based pharmacists, trusting them to complete recommendations. It was noted that further clarification of roles was needed.

Some studies described an almost subservient role of the hospital pharmacist. Rixon *et al* (2015) noted that pharmacists asked medical staff if they were "happy" to change prescriptions, in recognition that the doctor had overall responsibility for this. The approach of the pharmacists in my study seemed to differ according to their level of clinical experience as well as whether they were a prescriber and their sense of being a recognised member of the multidisciplinary team. A more junior pharmacist in my study did adopt the approach described by Rixon and colleagues; another more experienced pharmacist prescriber spoke of prescribing within the context of checking with the medical team, almost as a courtesy, whilst a third pharmacist routinely made changes to prescriptions with the confidence of her position in the team, a sense of knowing more than the FY1 doctors and that this was her role.

All of these studies highlighted a dichotomy between the difficulties of forming effective teams in acute hospital care, taking into account the differences between professions, the frequent turnover of teams in acute hospitals and the need for doctors, nurses and pharmacists to work in the most effective way when using medicines. A balance could be achieved by the collaborative production of a number of organisational principles which defined how individuals should work with medicines at ward level. This protective framework, alongside a level of autonomous practice, may achieve the best outcomes for patients and models should be explored further.

My study appears to illustrate how the use of medicines in acute healthcare in Northern Ireland is going through a period of transition due to many factors. Participants described the dynamics of *working together* as having

changed, with flatter, multidisciplinary working being valued and seen, on the whole, as providing support for each professional as well as patients and carers. This change may explain why junior doctors in my study felt supported in their practice, albeit within traditional working hours. This contrasted with the comments made by FY1 doctors in Dornan *et al's* study (2009), who spoke of feeling unsupported, in particular during ward-rounds and when working out-of-hours. It also contrasted with the observations of Milne *et al* (2015) of a perceived disrespect of doctors for other professionals. The authors commented that this could have emerged due to an unconscious appreciation of the need to work collaboratively with other professionals or alternatively from the hierarchical nature of healthcare which doctors dominated without a need to link with other healthcare professionals. This was not reflected in my study.

Kennedy *et al* (2009) produced a grounded theory of why junior doctors were reluctant to ask for help with prescribing and clinical decision making. The authors highlighted the pressures on trainee doctors to work independently, allowing them to feel that they are closer to becoming a doctor, as well as responding to the busyness of the clinical environment and a need to get things done.

Gregory and Austin (2016) studied how doctors and pharmacists developed trust in each other. They interviewed doctors (n=8) and pharmacists (n=11) who worked collaboratively in primary care teams in Canada. Little was known about how healthcare professionals developed mutual trust. They determined that pharmacists tended to trust doctors because of their position of authority and role. However doctors valued competence and working effectively. The authors stated that these differences in approach could impact on good relationships if there were expectations of having mutual trust. The pharmacists in my study spoke of respecting the role and responsibility which medical consultants had, seeing other grades of medical staff as their peers.

Working together in healthcare is about more than providing support to each other. All participants in my study described multi-professional

interdependencies where certain roles could only be carried out if other professionals had carried out their role effectively and accurately, for example, nurses cannot administer medicines unless they are certain that a prescription is accurate and appropriate. The system is forcing the management of risk by placing a professional obligation on nurses and pharmacists to check that prescriptions are right. There may be a relationship between the design of these interdependencies in not just protecting patients but also doctors, reflecting an imbalance in professional power in acute hospitals. This is touched upon by Borrott *et al* (2017) in their ethnographic study of medication communication between nurses and doctors for paediatric acute care, where there was some rebalancing of power through nurses refusing to administer medicines which had been prescribed inaccurately.

In looking at the literature, I cannot find a statement which specifically describes these inter-dependencies with regard to medicines-use in acute hospitals in this way. Borrott *et al* (2017) commented on how the requirement for nurses to meet professional standards affected the way they communicated with doctors when querying prescriptions.

A second type of inter-dependency was described by some of the medical staff at all grades in my study who spoke of using the nurse and pharmacist safety net as being part of their prescribing process. When they were uncertain of their prescribing they relied on pharmacists to pick up their errors, or fill in gaps in their prescribing. They also relied on nursing staff to pick up on their errors before administering a medicine. This has been described by other authors (Dornan *et al* 2009).

Communicating well is the third sub-category of *working together*. Participants in my study described *working together* and communicating well with their colleagues and patients. On reviewing the literature, I found three recent studies looking at how healthcare professionals communicated with each other about medicines in acute hospitals in Australia (Rixon *et al* 2015, Liu *et al* 2016, Wilson *et al* 2016). I will make reference to these three papers at different stages of this discussion. The observational methodologies which

were used by these authors allowed them to describe how doctors, nurses and pharmacists communicated, who they spoke to and the language used. I am unable to provide the same level of detail from the analysis of semi-structured interviews, in which participants may be providing a more positive view of reality; however by using the constant comparison method in my analysis, the strategy *working together* contains rich and thick description of what is happening here.

In my study, communication about medicines fell into one of two categories - seeking clarification or further information about a prescription or asking for information about a drug. Communication was usually verbal or through writing on the Kardex which was done by both the doctor and the pharmacist. Rixon *et al* (2015) commented that nurses and doctors tended to seek information directly from other healthcare professionals whereas the pharmacists in their study tended to access the literature. In my study, nurses and doctors described seeking information on medicines predominantly from pharmacists or sometimes specialist colleagues, for example, renal physicians. The pharmacists in my study described seeking information from the literature but also valued information on the use of a drug in practice from a pharmacist experienced in a specific clinical field or from another healthcare professional, for example, a palliative care nurse. They seemed to value a more in-depth knowledge of the use of a drug.

The “language discourses” used by doctors, nurses and pharmacists were investigated by Liu *et al* (2016) who adopted a critical ethnographic approach to determine how doctors, nurses, pharmacists and patients communicated when working with medicines in an acute hospital in Australia. They specifically looked at communication strategies. Their methodology included observations, field interviews using video recordings to improve reflexivity. 76 nurses, 31 doctors, 1 pharmacist and 27 patients consented to be part of the study.

Liu *et al* (2016) described nurses as filling gaps in patient care. The questions asked and the work carried out by nurses and pharmacists in my

study were also perceived as “filling the gaps” in prescriptions, providing clarity, correcting errors and helping the system to flow more easily.

Rixon *et al* (2015) stated that when asking questions about medicines, pharmacists tended to approach doctors to clarify prescriptions, whereas nurses tended to approach pharmacists about medicines supplies. They described this as, “reactive communication” which happened because the professionals were carrying out “traditional roles.” They did not see pharmacists proactively educating other healthcare professionals. I was unable to gather this detail. In my study, medical staff in particular described proactively updating nurses on recent prescribing decisions which they had made as they were aware of the implications to their practice, for example, having to make sure the medicine was available or chase a discharge letter. This also was described Liu *et al* (2016) who described nurses getting information on medicines from the pharmacist in a timely way, especially when the doctor was not on the ward.

In my study, nurses and pharmacists spoke about choosing what doctor to question as well as the approach to use. This also was described by Borrott *et al* (2017) who observed nurses speaking to doctors as part of inter-professional care. Wilson *et al* (2016) stated that nurses and pharmacists in their study did not feel confident in approaching doctors to query prescriptions and so used indirect communication methods for example, leaving notes on charts and not asking direct questions. Their participants described medication errors occurring as a result of, “poor communication and passive aggressive behaviours” (Wilson *et al* 2016: 653). Liu *et al* (2016) also commented that it was common practice for the ward pharmacist to write medication instructions for nurses on medication charts and leave notes for doctors to consider modifying medication orders. Pharmacists in my study described leaving notes for doctors in the past. This was described within the context of the benefits of being able to prescribe and make the change to the prescription themselves.

Junior doctors (FY1s) also spoke of feeling encouraged to seek advice from more senior doctors and other healthcare professionals. All junior doctors,

with one exception, described feeling well-supported by senior medical staff and by the other members of the multi—disciplinary teams in which they worked. They felt less-supported by medical colleagues when working out of hours. This may be because there are fewer staff around to provide support. This is a weakness in the system which may affect the way FY1 doctors work and make decisions out-of-hours. The literature supporting a move to seven-day working in the NHS described higher patient mortality rates for patients who had been admitted at weekends (out-of-hours) (Keogh 2013b). The level of support from senior medical colleagues described by FY1 doctors in my study seems greater to that described by Dornan *et al* (2009). These descriptions in my study of an open culture where professionals were able to ask for advice without concern were not mirrored in the literature. Papoutsi *et al* (2017) described what influenced how doctors-in-training prescribed anti-microbial agents. They described doctors making decisions within the context of managing their professional reputation within the clinical team. The authors also commented that newly qualified doctors may find it easier to ask a pharmacist for help as they had less concerns about being looked upon negatively by the pharmacist with whom, "relative status differences are more ambiguous" (2017:2420). The differences may be attributed to the participants in my study presenting an inaccurate, more positive picture, to the smaller number of participants in my study or may be because there is greater support in the system here.

All participants commented that the doctors, nurses and pharmacists on the ward communicated well, with a small number saying that in the past, communication could have been poor, for example about drugs being withheld, but now with medicines being reviewed more regularly, this has improved. Dornan *et al* (2009) describes miscommunication on the part of third parties, including patients, leading to FY1 trainees' errors.

Hannawa *et al* (2017) reinforced the ease with which errors can be made due to poor communication. She described communication in healthcare as, "an intensive, interactive, error-prone activity that often fails to achieve its purpose of creating a shared understanding. As a result, it has the potential to lead to patient harm"(2017:13). She described one of the features of

communicating well as ensuring communication and thought is given over a continuum of time as opposed to in one moment, thinking about the consequences of specific actions and how they could be better implemented. Nurses in my study described their key role in ensuring information was communicated between shifts and over time. They also had a longer term view of patient care, describing “seeing the whole patient.”

In my study, verbal communication was most commonly used by medical staff sometimes adding notes such as, “critical medicine- give on time” to a prescription for additional clarity. In 2010, the National Patient Safety Agency asked hospitals to put together a list of critical medicines which must be given on time (omitted doses). These lists are updated regularly. The importance of focusing on giving critical medicines on time was mentioned by almost all participants in my study, with nurses and pharmacists particularly focused on this. It is interesting to see that such clarity would be needed over and above the prescription of a medicine to be administered at a specific time. On paper the instruction looks fairly straightforward but in reality, there seemed to be shared, implicit deviations from prescribed practice. A system which is able to flex quickly in response to an incident is a resilient system but if there is constant flexing in the system, it may be time to involve the system users in re-design. Further research is needed in this area.

7.4.6 Ensuring each patient gets the right medicines

One of my first research questions was:

- Why do they (health care professionals) work this way?

The answer to this question is in the consequences of the theory which is *ensuring that each patient gets the right medicines.* This may not always have been the outcome for each patient and this knowledge spurred on the healthcare professionals in my study in actively *managing risk*.

Leger and Phillips (2017) developed a grounded theory, “Exerting Capacity,” which described how nurses kept patients safe. They interviewed 13 nurses

in acute hospital wards in Australia. Nurses believed that it was their duty to keep patients safe from harm. The authors described, “me-centric” and “patient-centric” nurses in their study. The former kept patients safe as best as they could whereas the latter used their gut feeling (as described by participants in my study) and anticipated problems to help keep patients safe.

All participants in my study spoke about *ensuring each patient gets the right medicines*. Each professional played their own part by prescribing, administering, checking and supplying the right medicines. *Using checks and balances* and *working together* allowed this to happen. Each participant focused on getting it right for each individual patient and this approach is central to optimising the use of medicines.

Medicines optimisation is defined by the National Institute for Health and Care Excellence (NICE) as, “person-centred approach to safe and effective medicines use to ensure that people obtain the best possible outcomes from their medicines” (2016). Achieving the best outcomes for patients however was not mentioned specifically by the participants in my study. This may be because, “getting the right medicines” and, “achieving the best outcomes” for patients have been viewed as synonymous terms by those who were interviewed. Also, it is challenging for healthcare professionals to measure the impact of their work in terms of patient outcomes, with outcomes-based accountability measures just beginning to be used by healthcare organisations.

7.5 Summary of findings

This section initially provides a summary of new findings from the research. I also go on to discuss implications of the research for future practice.

7.5.1 New findings

A number of new findings came from the data.

1. A grounded theory emerged from the data. Existing literature on inter-professional collaboration in acute hospitals used thematic analyses, adopting ethnographic or phenomenological approaches. My research has located process in how doctors, nurses and pharmacists work to optimise medicines in acute hospital settings within the context of Northern Ireland.

2. Key findings have uncovered a continual, underlying questioning surrounding the use of medicines, which fuelled an implicit understanding that individuals needed to continually manage risk. It also meant that additional *checks and balances* existed which could be viewed either as duplication of effort or indicative of a culture of safety.

3. Multi-professional inter-dependencies with respect to how the medicines management system is designed were highlighted. The relative responsibilities of each profession may reflect where power sits within acute hospitals. The importance of all healthcare professionals having a personal obligation to provide balanced, mutual support for each other when working with medicines should be made explicit and power rebalanced. The need for an accurate prescription, as well as the lack of medical staff and the need to improve access to medicines, has been one driver of the development of new professional roles such as pharmacist and nurse prescribers.

4. A healthcare culture which actively recognises and supports the development of new professional roles in acute hospitals in Northern Ireland is evident from this research. Such a culture was not reflected to the same extent in studies from other countries, for example, England, Australia and Canada. This may be indicative of the passage of time since these studies were carried out or of the size of Northern Ireland facilitating the development of practice. Also the participants, in particular FY1 doctors and pharmacists, described a more positive experience of practice when compared to that described in existing literature. These are two indicators of a positive continuum of change which can be harnessed for future work.

5. Studies have demonstrated the importance of getting medicines right on admission of a patient to hospital. A depth of knowledge of the patient and of medicines is needed to do this accurately. The pharmacist was identified in my study, and also in previous studies, as having this depth of knowledge both as a result of their approach and training. The developing role of the prescribing pharmacist, along with their specific focus on getting medicines right, could be targeted to prescribing at admission, in collaboration with medical colleagues. It was anticipated in my study that this would result in more streamlined working as well as more accurate and timely prescribing on admission.

6. Doctors described almost a hierarchical approach to prescribing with the more routine prescriptions being written by the most junior doctors.

7. Whereas this seems a common-sense approach, I have not seen it specifically described in the literature or practice.

7.5.2 Implications for future practice

"Apart from the logical soundness of the formation of a theory, its real test is its usefulness." (Bryant and Charmaz 2007:588)

When establishing the context for this study (Section 1.1), I stated that the theory produced would act as baseline information to inform the future design of a safe process for optimising medicines use in hospitals which would ensure best patient outcomes.

I have drawn out a number of practical implications of the theory in this section. These have been discussed with Trust Heads of Pharmacy and Medicines Management in Northern Ireland and Directors of Pharmacy in Scotland. A strategic paper is being finalised, incorporating the recommendations, which will be presented at the Northern Ireland Medicines Optimisation Strategic Group. This is a multi-professional group, chaired by the Chief Pharmaceutical Officer at the Department of Health in Northern Ireland. This also will be shared through publication of the study and as a two-country opinion article.

1. The theory demonstrates that healthcare professionals are *managing risk* through *working together* with a high level of inter-professional dependency in the system. This is a key *check and balance*. It may be indicative of a High Reliability Organisation and safety culture. It also may be indicative of a system which needs specific clinical leadership. The theory does provide an insight into the importance of making the implicit beliefs of doctors, nurses and pharmacists, such as using pharmacists and nurses as safety nets, explicit. The specific responsibilities and benefits of each professional's role with medicines should be defined, helping to establish specific ground-rules at ward level for the safe use of medicines. This would underpin each professional's personal responsibility to support their colleagues in having a collaborative focus on safe patient care. Making responsibilities clear, building mutual trust and an agreed set of cultural norms could support the safer use of medicines and the better use of resources. Health service managers and healthcare professionals need to be aware of specific professional roles and their inter-dependencies in relation to medicines. This study has

highlighted some new roles, beliefs and relationships. These will be defined in the paper to the Strategic Group.

Recommendation 1

The roles and practices of doctors, nurses and pharmacists with medicines in acute hospitals should be defined explicitly to inform health service managers, healthcare professionals and educators. Inter-dependencies will be highlighted. This will reinforce the current Northern Ireland Medicines Optimisation Framework which outlines what patients should expect with regard to medicines in different healthcare settings. This knowledge will help to underpin any medicines-related service redesign.

2. Drawing from the analogy of an orchestra in Table 18, in order to optimise medicines well, each player in this system has to listen to each other, take their cue from each other and the “conductor”. It is clear that the medicines optimisation system in acute hospitals in Northern Ireland does not have one leader and there are multiple healthcare professionals involved. Highly experienced and competent individuals as well as professionals-in-training work with medicines routinely and need support. Current problems should be named and practical solutions sought and implemented. In healthcare, it is important to strike a balance between the individual practice of intelligent, high-performing healthcare professionals and introducing key principles into how professionals work with medicines that would make things safer and easier for all concerned.

Recommendation 2

The role of a professional acting as the “conductor” or the Medicines Optimisation Lead on a ward or clinical area should be explored.

3. The current development of non-medical prescribing roles was mentioned by almost all of the participants in my study. The increasing number of non-medical prescribers will change the dynamic on acute wards. It is important to have a joined-up understanding across Northern Ireland of how and where these roles are developing to *ensure that each patient gets the right medicines* and provide safer patient care.

Recommendation 3

A regional multi-professional group should be established to map out, commission practice research on and determine the direction of travel for non-medical prescribing roles in the Province. This group would report to the Chief Professional Leads at the Department of Health in Northern Ireland.

4. *Managing risk* was a result of *working with the complex and the routine*. This study clearly has shown the important role of each professional in medicines optimisation. It also has highlighted the multi-factorial role of the medicines administration round, the key role of the nurse in knowing patients and the changing role of the pharmacist from, “filling the gaps” to prescribing and carrying out medicines reconciliation. The focus on getting the prescription, supply and administration of critical medicines right may be a symptom of a wider system which is not working effectively. Learning from the effort which is needed to use a small number of critical medicines well should be used to help inform system redesign. In the theory, healthcare professionals are *working together*, asking questions and seeking accurate information. Accurate and up-to-date information must be made easily available. This must be mapped out and its importance highlighted in the development of electronic prescribing and administration systems. The participants in my study spoke of wanting a simpler medicines system. The literature on Human Factors and Ergonomics advises that we train individuals in this science to aid us in designing systems. Such a strategic approach would support

a more systematic way to designing safe medicines management and optimisation systems in acute hospitals and across transitions of care.

Recommendation 4

There needs to be a renewed focus on the medicines management and optimisation processes at ward level. These need to be mapped out, resulting in innovative solutions which are patient as opposed to process-focused.

5. This study showed that there are a number of developments in medicines practice in acute hospitals in Northern Ireland and that these are broadly welcomed by all professions. This should be built upon and a medicines optimisation route map, linked to Bengoa's Transformation agenda, driven forward. This work could be supported by appointing Clinical Fellows from each profession with a focus on collaborative inter-professional working.

Recommendation 5

Write a regional medicines optimisation route map to support the Transformation agenda in Northern Ireland, linked with workforce plans.

6. The theory underpins the need for doctors, nurses and pharmacists to learn about *managing risk* in a multi-professional way, with true collaborative working. Healthcare professionals also should be taught how to make clinical decisions about the use of medicines as part of an overall continuum of care for each patient as opposed to focusing on discreet, acute decisions. This joined-up approach would allow healthcare professionals to see care from the patient's perspective and could support a reduced use of resources, as well as potentially improving quality of life. The importance of prescribing among medical staff should be reinforced.

This needs to begin during undergraduate training. The theory will be shared with undergraduate and postgraduate training leads in the two universities in Northern Ireland and with the Northern Ireland Medical and Dental Training Agency which has recently incorporated Pharmacy post-graduate training. Key influencers will be targeted.

Recommendation 6

Share this research with current undergraduate and post-graduate medical, nursing and pharmacy Course Directors, highlighting the importance of cross-professional learning.

7. This study gives a feel for progress in acute hospitals in Northern Ireland on the involvement of patients in medicines optimisation, although this is at an early stage. A specific focused piece of work is needed to provide and make available tools to support practitioners to do this routinely as part of their practice. This work will also provide guidelines on meaningful and proactive patient involvement in the development and review of medicines optimisation services.

Recommendation 7

Establish a regional group of healthcare professionals, patients and carers to provide practical guidance on involving patients at every stage of medicines optimisation and service design.

7.6 Implications for further research

From this process, there are a number of areas where further research could be carried out.

- Participants in my study and the early literature on non-medical prescribers suggests that non-medical prescribers have a focus, interest in and experience of prescribing which results in greater accuracy. Future work could build on current baseline data and measure the approach of non-medical prescribers over time to determine whether their prescribing role becomes monotonous and if this has an impact on their prescribing error rates.

- Comparison of my theory with the outcomes of other studies suggests a development in confidence and integration of pharmacists, especially those who are prescribers, into the multidisciplinary clinical team in Northern Ireland. Further work is needed to assess the risks and benefits of this change, measure the implications for patient care and make recommendations for new ways of working.

- I would like to work with doctors, nurses and pharmacists initially to pilot the development of a Medicines Charter at ward level. This Charter would be written collaboratively and would make the cultural norms for working with medicines on that ward explicit. The impact of this on patient outcomes and medicines risk could be measured.

- Research into the role of a professional acting as the “conductor” or the Medicines Optimisation Lead on a ward or clinical area should be carried out.

- Each professional described, “bringing something different” to the use of medicines. It would be interesting to define what the differences are between each profession which are important to safe practice and what we would lose if we blurred professional roles. This would help inform what must be incorporated into undergraduate training to maintain checks and balances. It would also inform whether we should

engender all of the approaches taken by other professionals into all professional training or is there a benefit in maintaining strong and specific professional boundaries to maintain rigor in the system. Further work could be carried out on measuring patient outcomes from autonomous clinical practice as compared with more shared decision making with shared accountability for medicines-related decisions.

- Implement and carry out research into training doctors, nurses and pharmacists together to allow true inter-professional collaboration and effective communication as well as new models of multi-professional working. This can build on the current literature in this area.

- Further research into the relative frequency with which the system flexes up when busy or when there is perceived additional risk is needed. This could inform future system redesign.

7.7 The relative strengths and limitations of the study

7.7.1 Strengths

My study provides an insight into how doctors, nurses and pharmacists work to optimise medicines in acute hospitals in Northern Ireland. I believe it achieved its aim and provided answers to my initial research questions.

It is the only study that I have found which produces a grounded theory of how all three healthcare professionals work with medicines in the acute hospital setting. Much of the literature on the inter-professional working of these professionals either focuses on community practice, on specific roles, for example non-medical prescribing, on inter-professional working between two professional groups or inter-professional communication. This study therefore adds to the body of knowledge in this area.

My study also provides a theory of how these professionals work with medicines in Northern Ireland at a time of healthcare transformation, as outlined in Systems not structures, changing health and social care (Bengoa

et al 2016). The theory also acts as a baseline to measure against as the Northern Ireland Medicines Optimisation Quality Framework (2016) is implemented and embedded into practice.

Many of my findings and elements of the theory reflect the literature on managing risk with medicines, looking at the complexity and mundanity of medicines' use and the importance of communication. Both this and feedback from the Directors of Pharmacy in Scotland and the members of the University of Bradford Medicines Optimisation Research Group support the credibility of the theory. I also presented an early poster at the University of Bradford.

Reflexivity and transparency are important features of the credibility of a study using qualitative methods. I am the Head of Pharmacy and Medicines Management in a Health and Social Care Trust in Northern Ireland. Whilst it is recognised that the experience and views of the researcher cannot be completely removed from a study, I wrote a reflexive personal statement at the outset of the study and have described the approaches I have taken to reduce the impact of this in the Methods Chapter.

I also used a specific Framework to critique my study (Appendix 18). This also shows credibility of this study.

7.7.2 Limitations

The lack of homogeneity of the sample used in this study could be viewed as a potential limitation, especially as the sample size is small in a grounded theory study. I used a heterogeneous sample (doctors, nurses and pharmacists), as the research question asked how members of these three professions optimised medicines. An initial sample of a doctor, a nurse and two pharmacists provided a breadth of data as a basis for theoretical sampling and constant comparison.

Creswell (2013) stated that theoretical sampling in grounded theory should begin with a homogeneous sample of, “individuals who have commonly experienced the action or process” (2013:154). My participants will have experienced working with medicines in acute hospitals but may not have commonly experienced this, due to their professional background and the hospitals that they have worked in. However, Strauss and Corbin (1998) described sampling in open coding as being, “open to those persons, places, and situations that will provide the greatest opportunity for discovery” (1998:206).

A different option would have been to gather initial data from one professional group, for example, doctors, and then continue with theoretical heterogeneous sampling; a further option would have been to change the research question to determine the views of, for example, doctors on how healthcare professionals optimise medicines. In deciding on my sample, I had to balance gathering data from a single professional perspective against having a breadth of data from each of the three professional groups. I am confident that the heterogeneity of the sample yielded rich data that provided a focus on how these healthcare professionals worked with medicines as members of inter-professional teams.

To reduce the potential limitations of a heterogeneous sample, I could have interviewed more participants, aiming to analyse the data from each professional group, saturate the data from each group and compare the results, as described by Morse (2007). Morse highlighted that pooling data from a range of cultural groups could result in it taking longer to reach saturation due to, “increasing noise (variation)” (2007: 232) in the sample. Morse also stated that initial selection of a demographically homogeneous sample is the most appropriate way to deal with this variation.

I did not analyse separately the data from the small sample size of each professional group (7 doctors, 4 nurses and 6 pharmacists) nor seek to saturate the data from each professional group. I analysed the data from the whole group. The importance of reaching saturation has been debated in the literature. From my discussion of saturation in Section 3.5.2.4, I believe that I

focused and reflected on the quality of the theory being produced, through the use of effective interview techniques, analysis and theoretical sampling and that I have produced a thick description of what is happening here.

Therefore on balance, I am confident that the data is sufficient to support my theory.

Using semi-structured interviews, did not allow me to actually see how individuals worked with medicines in practice. The use of observational methodology may have given a greater insight into the actions of individuals. I had looked at adopting this method when designing my study but realised that limitations in scope and time did not support the use of observations. An additional method, using focus groups, may have helped me to see how multi-professional teams interacted, albeit in the interview setting, but again this may have restricted open dialogue.

By looking at how individuals work in acute hospitals in Northern Ireland, I am narrowing the context of the study and limiting its generalisability within the framework of qualitative research. Also the nature of qualitative research is such that a representative sample of participants is not sought as would be the case in a quantitative study. Instead the rigor of the study design supports the potential for generalising findings within this context. I believe this study was carried out in a rigorous manner and this has been described more fully in Chapter 3.

I tried to ensure that the recruitment of participants was unaffected by the undue influence of colleagues. I had no links with and had not worked with or managed any of the participants apart from the person who I piloted the interview with, whom I had managed 10 years previously in a different hospital. Due to the challenge in recruiting individuals, some participants worked in the same clinical team. However all of these individuals, with the exception of one nurse, had previously worked in other clinical teams.

I gained experience and learning as an interviewer as I carried out the study. I used an outline interview guide and was aware of the importance of not asking leading questions. Together with my supervisors I reviewed the

transcripts from early interviews and reflected on interview technique and how I could improve it. However there were times when I felt, on reflection, that I could have chosen my words more effectively. It could be argued that an experienced interviewer would also be able to pick up on specific nuances.

Following three or four interviews, I was concerned that participants may not be clear what the term medicines optimisation meant. I discussed this with my supervisors and then checked what each participant's understanding was of the term at the end of each interview. Only one individual, a staff nurse, was not familiar with the term and was not able to define it; however she understood what optimising medicines meant in a general sense.

7.8 A personal reflection, outlining how I could improve the study

I enjoyed carrying out this study. If I was to carry out this study again I would try to improve it in the following ways:

I would allow myself more time to collect data using observation of the practice of doctors, nurses and pharmacists in acute hospitals. The richness of the data on inter-professional communication in the papers by Rixon *et al* (2015) and Wilson *et al* (2016) highlighted the benefits of that approach.

I would try to involve more medical consultants and staff nurses to participate in the study. This would have provided a wider perspective on using medicines in acute hospitals.

I would discuss and test my final findings with more colleagues to support my own confidence in the importance and relevance of the developed theory.

7.9 Conclusions

Through this work, I achieved my aim to produce a theory grounded in data from participating doctors, nurses and pharmacists working with medicines each day in acute hospital settings. There are a number of new findings from my study which have addressed gaps in the literature.

Medicines optimisation involves a person-centred approach and participants reported ways in which they involved patients in checking and in decision-making about their medicines. One negative case was documented.

The theory describes how the complex and routine nature of acute healthcare leads up to professionals *managing risk* through *using checks and balances* and *working together* to *ensure that each patient gets the right medicine*. The core category *managing risk* resonates with the literature which adds credibility to the research.

My motivation and interest in producing a theory was to have a robust way of making explicit what is implicit in the day-to-day work of professionals with medicines. Having such clarity can help inform how cultural norms are agreed with all members of the team on each ward. Finally it can be used to establish pillars in the redesign of safer, more streamlined ways of using medicines in acute hospitals in Northern Ireland.

8.0 References

Abuzour, A.S., Lewis, P.L. and Tully, M.P. (2018) Practice makes perfect: A systematic review of the expertise development of pharmacist and nurse independent prescribers in the United Kingdom. *Research in Social and Administrative Pharmacy* 14, 6-17.

Achora, S. and Matua, G.A. (2016) Essential methodological considerations when using grounded theory. *Nurse Researcher* 23(6), 31-6.

Afolabi, M. (1992) The review of related literature in research. *International Journal of Information and Library Research* 4(1), 59-66.

Alsulami, Z., Choonor, I. and Conroy, S. (2013) Paediatric nurses' adherence to the double-checking process during medication administration in a children's hospital: an observational study. *Journal of Advanced Nursing* 70(6), 1404 - 1413.

Ashcroft, D.M., Lewis, P.J., Tully, M.P., Farragher, T.M., Taylor, D., Wass, V., Williams, S.D. and Dornan, T. (2015) Prevalence, nature, severity and risk factors for prescribing errors in hospital inpatients: prospective study in 20 UK hospitals. *Drug Safety* 38 (9), 833-843.

Audit Commission. *A spoonful of sugar: medicines management in NHS hospitals.* December 2001.

Ballinger, C. (2004) Writing-up rigour: representing and evaluating good scholarship in qualitative research. *British Journal of Occupational Therapy* 67(12),1.

Barbour, R.S. (2001) Checklists for improving rigour in qualitative research: a case study of the tail wagging the dog? *British Medical Journal* 322(7294), 1115-1117.

Bengoa, R., Stout, A., McAlinden, M. and Taylor, M.A. (2016) *Systems not structures: changing health and social care: expert panel report.* Department of Health.

Benner, P. (1984) *From novice to expert- excellence and power in clinical nursing practice*. Addison-Wesley Publishing Company.

Birks, M. and Mills, J. (2015) *Grounded theory. A practical guide*. 2nd edition. SAGE Publications.

Black, L. (2014), *Prescriptions: costs and charges in the UK and Republic of Ireland.* Research and information service briefing note. Northern Ireland Assembly.

Bluff, R. (2005) Grounded theory: the methodology. In Holloway, I. (editor) *Qualitative Research in Healthcare*. Open University Press. 147-165.

Borrott, N., Kinney, S., Newall, F., Williams, A., Cranswick, N., Wong, I. and Manias, E. (2017) Medication communication between nurses and doctors for paediatric acute care: an ethnographic study. *Journal of Clinical Nursing* 26 (13-14), 1978-1992.

Bryant, A. and Charmaz, K. (editors) (2007) *The SAGE handbook of grounded theory.* SAGE Publications.

Bryant, R., Chaar, B. and Schneider, C. (2018) Differing clinical pharmacy service models: quantitative and qualitative analysis of nurse perceptions of support from pharmacists. *International Journal of Nursing Studies* 86, 90-98.

Buckley, P., Grime, J. and Blenkinsopp, A. (2006) Inter- and intra-professional perspectives on non-medical prescribing in an NHS Trust. *Pharmaceutical Journal* 277, 394-398.

Burke, P.J. and Stets, J.E. (2009) *Identity theory*. Oxford University Press Inc.

Charmaz, K. (2000) *Grounded theory: objectivist and constructivist methods.* 2nd edition. SAGE Publications.

Charmaz, K. (2006) *Constructing grounded theory. A practical guide through qualitative analysis.* SAGE Publications.

Charmaz, K. (2014) *Constructing grounded theory.* 2nd edition. SAGE Publications.

Chiovitti, R.F. and Piran, N. (2003) Rigour and grounded theory research. *Journal of Advanced Nursing* 44(4), 427-435.

Clarke, A.E. (2005) *Situational analysis: grounded theory after the postmodern turn.* SAGE Publications.

Cohen, L. and Manion, L. (1994) *Research methods in education.* 4th edition. London: Routledge.

Corbin, J. and Strauss, A. (2008) *Basics of qualitative research.* 3rd edition. SAGE Publications.

Corbin, J. and Strauss, A. (2015) *Basics of qualitative research.* 4th edition. SAGE Publications.

Crawley, W. and Compton, J. (2018), *Talkback.* [Radio Programme], BBC Radio Ulster, 5 February 2018.

Creswell, J.W. (2013) *Qualitative inquiry and research design.* 3rd edition. SAGE Publications.

Creswell, J.W. and Creswell, J.D. (2018) *Research design: qualitative, quantitative, and mixed-methods approaches*. 5th edition, SAGE Publications.

Data Protection Act (1998), www.legislation.gov.uk Accessed 19 September 2017.

Deans, C. (2005) Medication errors and professional practice of registered nurses. *Collegian* 12(1), 29-33.

Denscombe, M. (2010) *The good research guide.* 4th edition. Open University Press.

Department of Health (2000) *Pharmacy in the Future- Implementing the NHS Plan*
webarchive.nationalarchives.gov.uk/+?www.dh.gov.uk/en/…/DH_4005917 Accessed 23 January 2015.

Department of Health and Social Care (2018) *The report of the short life working group on reducing medication-related harm.* https://assets.publishing.service.gov.uk Accessed 24 May 2018.

Department of Health and Social Care (2018) *Learning from Gosport: the government response to the report of the Gosport independent panel.* https://www.gov.uk/government/publications/gosport-independent-panel-report-government-response Accessed 23 November 2018.

Department of Health, Social Services and Public Safety (2005)

Research ethics framework.
http://www.dhsspsni.gov.uk/research_governance_framework.pdf Accessed 5 May 2014.

Department of Health, Social Services and Public Safety (2011) *Quality 2020. A 10-year strategy to protect and improve quality in health and social care in Northern Ireland.* www.health-ni.gov.uk Accessed 17 September 2017.

Department of Health, Social Services and Public Safety (2016) *Medicines optimisation quality framework.* https://www.health-ni.gov.uk/publications/northern-ireland-medicines-optimisation-quality-framework Accessed 14 April 2017.

Dickson, G.L. and Flynn, L. (2012) Nurses' clinical reasoning: processes and practices of medication safety. *Qualitative Health Research* 22(1), 3 – 16.

Dixon-Woods, M., Baker, R., Charles, K., Dawson, J., Jerzembek, G., Martin, G., McCarthy, I., McKee, L., Minion, J., Ozieranski, P., Willars, J., Wilkie, P. and West, M. (2014) Culture and behaviour in the English National Health Service: overview of lessons from a large multimethod study. *British Medical Journal Quality and Safety* 23(2), 106-115.

Donaldson (2014) *The right time, the right place*. www.dhsspsni.gov.uk/ldreport270115.htm Accessed 30 March 2015.

Dornan, T., Ashcroft, D., Healthfield, H., Lewis, P., Miles, J., Taylor, D., Tully, M. and Wass, V. (2009) *An in depth investigation into causes of prescribing errors by foundation trainees in relation to their medical education. EQUIP study.* www.gmc-uk.org Accessed 29 September 2018.

Drinka, T.J.K. and Clark, P.G. (2000) *Healthcare Teamwork. Interdisciplinary Practice and Teaching*. Greenwood Publishing Group.

Eisenhauer, L.A., Hurley, A.C. and Dolan, N. (2007) Nurses' reported thinking during medication administration. *Journal of Nursing Scholarship* 39(1), 82-87.

Elvey, R., Hassell, K. and Hall, J. (2013) Who do you think you are? Pharmacists' perceptions of their personal identity. *International Journal of Pharmacy Practice* 21, 322-332.

Estabrooks, C.A., Midodzi, W.K., Cummings, G.G., Ricker, K.L. and Giovannetti, P. (2005) The impact of hospital nursing characteristics on 30-day mortality*. Nursing Research* 54(2), 74 – 84.

Evans, D., Gruba, P. and Zobel, J. (2014) *How to write a better thesis.* 3rd edition. Springer.

Francis, R. (2013) *Report of the Mid Staffordshire NHS Foundation Trust public inquiry.* www.gov.uk/...report-of-the-mid-staffordshire-nhs-foundation-trust Accessed 13 July 2014.

Freshwater, D., Cahill, J., Walsh, E. and Muncey, T. (2010) Qualitative research as evidence: criteria for rigour and relevance. *Journal of Research in Nursing* 15, 497-508.

General Medical Council (2013) *Good practice in prescribing and managing medicines and devices.* www.gmc-uk.org>ethical guidance Accessed 7 December 2018.

Giacomini, M.K. and Cook, D.J. (2000a) Users' guides to the medical literature: XXIII. Qualitative research in healthcare A. Are the results of the study valid? Evidence-based Medicines Working Group. *Journal of the American Medical Association* 284(3), 357-362.

Giacomini, M.K. and Cook, D.J. (2000b) Users' guides to the medical literature: XXIII. Qualitative research in healthcare B. What are the results and how do they help me care for my patients? Evidence-based Medicines Working Group. *Journal of the American Medical Association* 284(4), 478 - 482.

Gillespie, U., Morlin, C., Hammarlund-Udenaes, M. and Hedstrom, M. (2012) Perceived value of ward-based pharmacists from the perspective of physicians and nurses. *International Journal of Pharmacy Practice* 34(1), 127-135.

Glaser, B.G. (1992) *Basics of grounded theory analysis: emergence vs forcing.* Sociology Press.

Glaser, B.G. (2001) *The grounded theory perspective.* Sociology Press.

Glaser, B.G. and Holton, J. (2004) Remodelling grounded theory, *Forum: Qualitative Social Research* 5(2) Art 4.

Glaser, B.G. and Strauss, A.L. (1967) *The discovery of grounded theory: strategies for qualitative research.* Chicago, Aldine Publishing Company.

Glaser, B.G. and Strauss, A.L. (2015) *Time for Dying.* 2nd paperback print. Aldine Transaction.

Gosport War Memorial Hospital: the report of the Gosport independent panel (2018) https://www.gosportpanel.independent.gov.uk/panel-report/ Accessed 20th June 2018.

Greenhalgh, T. (2006) *How to read a paper- the basics of evidence-based medicine.* 4th edition. Wiley-Blackwell.

Gregory, P.A.M. and Austin, Z. (2016) Trust in inter-professional collaboration: perspectives of pharmacists and physicians. *Canadian Pharmaceutical Journal (Ott)* 149, 236-245.

Hannawa, A., Wu, A. and Juhasz, R. (2017) *New horizons in patient safety: understanding communication*. De Gruyter.

Health and Care Professions Council (2011) *Professionalism in healthcare professionals.* www.hcpc-uk.org Accessed 13 December 2015.

Hewitt, T., Chreim, S. and Forster, A. (2016) Double checking: a second look. *Journal of Evaluation in Clinical Practice,* 22(2), http://doi.org/10.1111/jep.12468. Accessed 24 October 2018.

Higgins, M.P. and Tully, M. (2005) Hospital doctors and their schemas about appropriate prescribing. *Medical Education* 39, 184-193.

Hignett, S., Lang, A., Pickup, L., Ives, C., Fray, M., McKeown, C., Tapley, S., Woodward, M. and Bowie, P. (2018) More holes than cheese. What prevents the delivery of effective, high quality and safe healthcare in England? *Ergonomics* 61(1), 5-14.

Hill Bailey, P. (1997) Finding your way around qualitative methods in nursing research. *Journal of Advanced Nursing* 25(1), 18-22.

Hind, M., Norman, I., Cooper, S., Gill, E., Hilton, R., Judd, P. and Jones, S. (2003) Inter-professional perceptions of healthcare students. *Journal of Interprofessional Care* 17(1), 21-34.

Holloway, I. (editor) (2005) *Qualitative research in health care.* Open University Press.

Holloway, I. and Walker, J. (2000) *Getting a PhD in health and social care.* Blackwell Science Ltd.

Horsburgh, D. (2003) Evaluation of qualitative research. *Journal of Clinical Nursing* 12(2), 307-312.

Hsiros, S. and Thomson, R. (2013) Seeing it from both sides: do approaches to involving patients in improving their safety risk damaging the trust between patients and healthcare professionals? An interview study. *PLoS One.* 8(11): e80759, 1-34.

Hughes, C.M. and McCann, S. (2003) Perceived inter-professional barriers between community pharmacists and general practitioners: a qualitative assessment. *British Journal of General Practice* 53, 600-606.

Illing, J., Morrow, G., Kergon, C., Burford, B., Spencer, J., Peile, E., Davies, C., Baldauf, B., Allen, M., Johnson, N., Morrison, J., Donaldson, M., Whitelaw, M. and Field, M. (2008) How prepared are medical graduates to begin practice? A comparison of three diverse UK medical schools. *Final report to the General Medical Council.* www.gmc-uk.org Accessed 20 September 2018.

Jones, M. and Alony, I. (2011) Guiding the use of grounded theory in doctoral studies – an example from the Australian Film Industry. *International Journal of Doctoral Studies* 6, 95-114.

Kairuz, T., Crump, K. and O'Brien, A. (2007) An overview of qualitative research. *Pharmaceutical Journal* 277, 312- 314.

Keers, R.N., Placido, M., Bennett, K., Clayton, K., Brown, P. and Ashcroft, D. (2018) What causes medication administration errors in a mental health hospital? A qualitative study with nursing staff. PLoS ONE 13(10): e0206233.

Kennedy, T.J.T., Regehr, G., Ross-Baker, G. and Lingard, L. (2009) Preserving professional credibility: grounded theory study of medical trainees' requests for clinical support. *British Medical Journal* 338: b128.

Keogh, B. (2013a) *Review into the quality of care and treatment provided by 14 NHS hospital trusts in England: overview report.* www.nhs.uk/nhsengland/bruce-keogh.../keogh-review-final-report.pdf Accessed 13 July 2014.

Keogh, B. (2013b) *NHS services, seven days a week forum. Summary of initial findings*. www.england.nhs.uk Accessed 14 January 2014.

King, N. and Horrocks, C. (2010) *Interviews in qualitative research.* SAGE Publications.

Kitzinger, J. (1994) The methodology of focus groups: the importance of interactions between research participants. *Sociology of Health and Illness* 16(1), 103-121.

Kvale, S. (2008) *Doing interviews.* SAGE Publications.

Lapkin, S., Levett-Jones T, Gilligan C.A (2013) Systematic review of the effectiveness of interprofessional education in health professional programmes. Nurse Education Today 33: 90-102.

Lasselain, J. (1991) Self-perception of occupational roles of community pharmacists in the French health system. *Journal of Social and Administrative Pharmacy* 8, 130- 135.

Leape, L.L., Bates, D.W., Cullen, D.J., Cooper, J., Demonaco, H.J., Gallivan, T., Hallisey, R., Ives, J., Laird, N., Laffel, G., Nemeskal, R.N., Peterson, L.A., Porter, K., Servi, D., Shea, B.F., Small, S.D., Sweitzer, B.J., Taylor-Thompson, B., Vander Vliet, M., Bates, D., Hojnowski-Diaz, P., Petrycki, S., Cotugno, M., Patterson, H., Hickey, M., Kleefield, S., Kinneally, E., Dempsey Clapp, M., Hackman, J.R. and Edmondson, A. (1995) Systems analysis of adverse drug events. *Journal of the American Medical Association* 274(1), 35-43.

Leger, J.M. and Phillips, C.A. (2017) Exerting capacity: bedside RNs talk about patient safety. *Western Journal of Nursing Research* 39(5), 660-673.

Lekka, C. (2011) High reliability organisations. *Health and Safety Executive*. Research Report 899

Lewin, S. and Reeves, S. (2011) Enacting 'team' and 'teamwork': using Goffman's theory of impression management to illuminate inter-professional practice on hospital wards. *Social Science and Medicines* 72(10), 1595-1602.

Lewis, P.J. and Tully, M. (2009) Uncomfortable prescribing decisions in hospitals: the impact of teamwork. *Journal of the Royal Society of Medicine* 102, 281-288.

Lewis, P.J., Dornan, T., Taylor, D., Tully, M.P., Wass, V. and Ashcroft, D.M. (2009) Prevalence, incidence and nature of prescribing errors in hospital inpatients: a systematic review*. Drug Safety* 32 (5): 379-389.

Liberati, A., Altman, D.G., Tetzlaff, J., Mulrow, C., Gotzsche, P.C., Ioannidis, J.P.A., Clarke, M., Devereaux, P.J., Kleijnen, J. and Moher, D. (2009) The PRISMA statement for reporting systematic review and meta-analysis of studies and evaluated health care interventions: explanation and elaboration, PLoS Medicine 6(7):e1000100.

Lincoln, Y.S. and Guba, E.G. (1985) *Naturalistic Inquiry*. Newbury Park. CA. SAGE Publications.

Liu, W., Gertz, M. and Mania, E. (2016) Creating opportunities for interdisciplinary collaboration and patient-centred care: how nurses, doctors, pharmacists and patients use communication strategies when managing medicines. *Journal of Clinical Nursing* 25 (19-20), 2943-2957.

Locke, K.D. (2001) *Grounded theory in management research*. SAGE Publications.

Lord Carter of Coles (2016) Operational productivity and performance in English NHS Acute Hospitals: unwarranted variations. *An independent report for the Department of Health by Lord Carter of Coles*. https://www.gov.uk/government/publications/productivity–in-nhs-hospitals Accessed 12 December 2018.

MacDonald, M.T., Heilemann, M.S.V., McKinnon, N.J., Lang, A., Gregory, D., Gurnham, E. and Fillatre,T. (2014) Confirming delivery: understanding the role of the hospitalized patient in medication administration safety. *Qualitative Health Research* 24(4), 536–550.

McGlynn, M.C., Scott, H.R., Thomson, C., Peacock, S. and Paton, C. (2012) How we equip medical undergraduates with prioritisation skills using simulated teaching scenarios. *Medical Teacher* 34(7), 526-52.

McNair, R., Taft, A. and Hegarty, K. (2008) Using reflexivity to enhance in-depth interviewing skills for clinical research. *BioMed Central Medical Research Methodology 8* 73. doi:10:1186/1471-2288-8-73.

Makowsky, M.J., Schindel, T.J., Rosenthal, M., Campbell, K., Tsuyuki, R.T. and Madill, H.M. (2009) Collaboration between pharmacists, physicians and nurse practitioners: a qualitative investigation of working relationships in the inpatient medical setting. *Journal of Inter-professional Care* 23(2) 169–184.

Makowsky, M.J., Madill, H.M., Schindel, T.J. and Tsuyuki, R.T. (2013) Physician perspectives on collaborative working relationships with team-based hospital pharmacists in the inpatient medicines setting. *International Journal of Pharmacy Practice* 21, 123-127.

Manias E., Rixon, S., Williams, A., Liew, D. and Braaf, S. (2014) Barriers and enablers affecting patient engagement in managing medications within specialty hospital settings. *Health Expectations* 18(6), 2787-2798.

Manias, E., Gerdtz, M., Willams, A. and Dooley, M. (2015) Complexities of medicines safety: communicating about medicines management at transition points of care across emergency departments and medical wards. *Journal of Clinical Nursing* 24 (1-2), 69-80.

Markey, K., Tilki, M. and Taylor, G. (2014) Reflecting on the challenges of choosing and using a grounded theory approach. *Nurse Researcher* 22(2), 16-22.

Martin, V.B. (2006) The relationship between an emerging grounded theory and the existing literature: four phases for consideration. *The Grounded Theory Review* 5(2/3), 47-57.

Mason, M. (2010) Sample size and saturation in PhD studies using qualitative interviews. *Forum: Qualitative Social Reviews* 11(3), Art 8.

Mays, N. and Pope, C. (2000) Assessing quality in qualitative research. *British Medical Journal* 320 (7226), 50-52.

Mayo, A.M. and Ducan, D. (2004) Nurse perceptions of medication errors: what we need to know for patient safety. *Journal of Nursing Care Quality* 19(3), 209-17.

Miller, R., Darcy, C., Friel, A., Scott, M. and Toner, S. (2016) Consultant pharmacist case management of older people in intermediate care: a new innovative model. *European Journal for Person Centred Healthcare* 4(1), 46-52.

Milne, J., Greenfield, D. and Braithwaite, J. (2015) An ethographic investigation of junior doctors‘ capabilities to practice interprofessionally in three teaching hospitals. *Journal of Inter-professional Care* 29(4), 347 – 353.

Morrow, S.L. (2005) Quality and trustworthiness in qualitative research in counselling psychology. *Journal of Counselling Psychology* 24(2), 250-260.

Morse, J.M. (2007) Sampling in grounded theory. In Bryant, A. and Charmaz, K. (editors) *The SAGE handbook of grounded theory*. SAGE Publications.

Moustakas, C., (1994). *Phenomenological research methods*. SAGE Publications.

Mukadam, N., Cooper, C. and Livingston, G. (2011) A systematic review of ethnicity and pathways to care in dementia. *International Journal of Geriatric Psychiatry* 26 (1), 12-20.

National Institute for Health and Care Excellence (NICE) (2015) *Medicines optimisation: the safe and effective use of medicines to enable the best possible outcomes*. *NG5.*

National Institute for Health and Care Excellence (NICE) (2016) *Medicines optimisation quality standard. QS120.*

National Patient Safety Agency (2010), NPSA Alert- *Reducing harm from omitted and delayed doses in hospital.*

Neufeld, V.R., Maudsley, R.F., Pickering, R.J., Turnball, J.M., Weston, W.W., Brown, M.G. and Simpson, J.C. (1998) Educating future physicians for Ontario. *Academic Medicine* 73(11), 1133-1148.

NHS Health Research Authority (2017) *UK Policy Framework for Health and Social Care Research* https://www.hra.nhs.uk/planning-and-improving-research/policies-standards-legislation/uk-policy-framework-health-social-care-research/ Accessed 14 April 2017.

Nicholas, D.B., Lach, L., King, G., Scott, M., Boydell, K., Sawatzky, B.J., Reisman, J., Schippel, E. and Young, N.L. (2010) Contrasting internet and face-to-face focus groups for children with chronic health conditions: outcomes and participant experiences. *International Journal of Qualitative Methods 9(1), 105-121.*

Nugus, P., Greenfield, D., Travaglia, J., Westbrook, J. and Braithwaite, J. (2010) How and where clinicians exercise power: inter-professional relations in health care. *Social Science in Medicine* 71(5), 898-909.

Nunes, M.B., Martins, J.T., Zhou, L., Alajamy, M. and Al-Mamari, S. (2011) Contextual sensitivity in grounded theory: the role of pilot studies. *Electronic Journal of Business Research Methods* 8(2), 73-84.

Nursing and Midwifery Council (2007) *Standards for medicines management.* www.nmc.org.uk>standards Accessed 16 August 2016.

Oktay, J. S. (2012) *Grounded theory.* Oxford University Press.

Onatade, R. and Quaye, S. (2018) Economic value of pharmacy-led medicines reconciliation at admission to hospital: an observational, UK-based study. *European Journal of Hospital Pharmacy* 25, 26–31.

*Oxford English Dictionary (*2018) Oxford University Press.

Papoutsi, C., Mattick, K., Pearson, M., Brennan, N., Briscoe, S. and Wong, G. (2017) Social and professional influences on antimicrobial prescribing for doctors-in-training: a realist review. *Journal of Antimicrobial Chemotherapy* 72(9), 2418- 2430.

Penm, J., Jorgenson, D., MacKinnon, N.J. and Smith, J. (2017) Part 1: barriers to the advancement of the pharmacy profession*. Canadian Pharmacy Journal (Ottawa)* 150(3), 150 - 152.

Pharmaceutical Society of Northern Ireland (2016) *Professional standards of conduct, ethics and performance for pharmacists in Northern Ireland.*

Phillips, J., Beam, S., Brinker, A., Holquist, C., Honig, P. and Lee, L.Y. (2001) Retrospective analysis of mortalities associated with medication errors. *American Journal of Health-System Pharmacy* 58(19), 1835-1841.

Ray, M.D. (1998) Shared borders: achieving the goals of interdisciplinary patient care. *American Journal of Health- System Pharmacy* 55(13), 1369-74.

Reason, J. (2000) Human error: models and management. *British Medical Journal* 320, 768-770.

Richards, L. and Morse, J.M. (2007) *Users guide for qualitative methods.* (2nd edition). Thousand Oaks: CA SAGE Publications.

Rixon, S., Braaf, S., Williams, A., Liew, D. and Manias, E. (2015) Pharmacists' inter-professional communication about medications in specialty hospital settings. *Health Communication* 30(11), 1065-1075.

Royal College of Nursing (2014) *Specialist nurses make a difference.* www.rcn.org.uk Accessed 28 November 2018.

Royal Pharmaceutical Society (2013) Medicines optimisation. Helping patients make the most of their medicines: good practice guidance for healthcare professionals in England. www.rpharms.com accessed 14 July 2015.

Royal Pharmaceutical Society (2018) Professional guidance on the safe and secure handling of medicines. Accessed at www.rpharms.com on 28 December 2018.

Ryan, C., Ross, S., Davey, P., Duncan, E.M., Francis, J.J., Fielding, S., Johnston, M., Kerr, J., Lee, A.J., MacLeod, M.J., Maxwell, S., McKay, G.A., McLay, J.S., Webb, D.J. and Bond, C. (2014) Prevalence and causes of prescribing errors: the prescribing outcomes for trainee doctors engaged in clinical training (PROTECT) study. PLoS ONE 9(1): e79802.

Rydenfalt, C., Johansson, G., Larsson, P.A., Akerman, K. and Odenrick, P. (2011) Social structures in the operating theatre: how contradicting rationalities and trust affect work. *Journal of Advanced Nursing* 68(4), 783 – 795.

Schon, D.A. (1983) *The reflective practitioner: how professionals think in action.* New York. Basic Books.

Scullin, C., Scott, M.G., Hogg, A. and McElnay, J.C. (2007) An innovative approach to integrated medicines management. *Journal of Evaluation in Clinical Practice* 13(5), 781-88.

Scullin, C., Hogg, A., Luo, R., Scott, M.G. and McElnay, J.C. (2011) Integrated medicines management – can routine implementation improve quality? *Journal of Evaluation in Clinical Practice* 18(4), 807-815.

Seden, K., Kirkham, J.J., Kennedy, T., Lloyd, M., James, S., McManus, A., Ritchings, A., Simpson, J., Thornton, D., Gill, A., Coleman, C., Thorpe, B. and Khoo, S.H. (2013) Cross-sectional study of prescribing errors in patients admitted in nine hospitals across North West England. *British Medical Journal Open* 3: e002036. Doi:10.1136/bmjopen-2012-002036.

Silverman, D.(2010) *Doing qualitative research – a practical handbook.* 3rd edition. SAGE Publications.

Smetzer, J. (2007). The five rights: a destination without a map. *Institute for Safe Medication Practice Medication Safety Alert.* 12(2). ismp.org Accessed 25 August 2018.

Spence Laschinger, H.K., Shamian, J. and Thomson, D. (2001) Impact of magnet hospital characteristics on nurses' perceptions of trust, burnout, quality of care, and work satisfaction. *Nursing Economics* 19(5), 209-219.

Spencer, L., Richie, J., Lewis, J. and Dillon, L. (2003) Quality in qualitative evaluation: a framework for assessing research evidence. *A Quality Framework: Government Chief Social Researcher's Office*. 7-15. ISBN: 07715 04465 8.

Strauss, A. (1987) *Qualitative analysis for social scientists*. Cambridge, UK. Cambridge University Press.

Strauss, A. and Corbin, J. (1990) *Basics of qualitative research.* SAGE Publications.

Strauss, A. and Corbin, J. (1998) *Basics of qualitative research.* 2nd edition. SAGE Publications.

Stringer, K., Curran, V. and Ashgari, S. (2013) Pharmacists and family physicians: improving inter-professional collaboration through joint understanding of our competencies. *Frontiers in Pharmacology* 3, 151-160.

Taylor, M.C. (2005) Interviewing. In Holloway, I. (editor) *Qualitative Research in Healthcare*. Open University Press.

Thistoll, T., Hooper, V. and Pauleen, D.J. (2016) Acquiring and developing theoretical sensitivity through undertaking a grounded theory preliminary literature review. *Quality and Quantity*. 50(2), 619-636.

Urlings, I. and Nijhuis, F. (1998) Determinants of safe behaviours of construction workers. *Mag Society of Health Care* 66, 134-138.

Urquart, C. (2013) *Grounded theory for qualitative research: a practical guide.* SAGE Publications.

Urquart, C. and Fernandez, W. (2006) Grounded theory method: the researcher as a blank slate and other myths. *International Conference on Information Systems (ICIS) 2006, Proceedings*.31.

van Manen, M. (1990) *Researching lived experience: human science for an action sensitive pedagogy*. Althouse Press, Ontario.

Vincent, C. and Amalberti, R. (2016), *Safer healthcare: strategies for the real world.* Springer Open.

Vivar, C., McQueen, A., Whyte, D.A. and Armayor, N.C. (2007) Getting started with qualitative research: developing a research proposal. *Nurse Researcher* 14(3), 60-73.

Walker, S.B. and Lowe, M.J. (1998) Nurses' views on reporting medication incidents. *International Journal of Nursing Practice* 4(2), 97-102.

Wallace, S. (2005) Observing method: recognising the significance of belief, discipline, position and documentation in observational studies. In Holloway, I. (editor) *Qualitative Research in Healthcare*. Open University Press.

Weick, K.E. (1987) Organisational culture as a source of high reliability. Californian Management Review 29(2), 112- 127.

Weick, K.E. and Sutcliffe, K.M. (2001) *Managing the unexpected: assuring high performance in an age of complexity*. Jossey-Bass.

Weller, J.M., Barrow, M. and Gasquoine, S. (2011) Inter-professional collaboration among junior doctors and nurses in the hospital setting. *Medical Education* 45(5), 478-87.

Willig, C. (2001) *Introducing qualitative research in psychology. Birmingham.* Open University Press.

Wilson, A.J., Palmer, L., Levett, T., Gilligan, C., Outram, S. (2016) Inter-professional collaborative practice for medication safety: nursing, pharmacy and medical graduates' experiences and perspectives. *Journal of Inter-professional Care* 30 (5), 649-654.

Wisker, G. (2008) *The postgraduate research handbook*. 2nd edition. Palgrave Macmillan.

Woolgar, S.E. (editor) (1988) *Knowledge and reflexivity: new frontiers in the sociology of knowledge.* Thousand Oaks, CA, US: SAGE Publications.

World Health Organisation (2010) *Framework for action on inter-professional education and collaborative practice.*

World Health Organisation (2017) *Medication without Harm: Third Global Safety Challenge.*

Yip, L. and Farmer, B. (2015) High reliability organisations– medication safety. *Journal of Medical Toxicology* 11(2), 257-261.

9.0 Appendices

Appendix 1 A reflexive personal statement

I am a hospital pharmacist with 31 years' experience. I have worked in the management roles of Director of Pharmaceutical Services and Head of Pharmacy and Medicines Management in two of the five Health and Social Care (HSC) Trusts in Northern Ireland - Area Pharmaceutical Service, Craigavon Area Hospital (currently Southern HSC Trust) from 1998-2005 and the Western HSC Trust from 2005 to present. I have been in a management and leadership role within pharmacy in Northern Ireland for 20 years. This may introduce a potential power imbalance between me as researcher and participants, especially the pharmacists. To reduce the impact of this, I did not recruit participants from my current Trust. I recruited participants who I have never managed or worked with (apart from the pilot interview – see memo in Appendix 7). When initially recruiting participants, colleagues in other Trusts who know me were trying to help to proactively recruit other healthcare professionals. I was concerned that my participants therefore may be more positively predisposed to the role of pharmacists and following discussion with my supervisors, I explained this dilemma to colleagues, thanked them but did not interview the participants identified by them. Three of the doctors made reference to the benefits of having clinical pharmacists at ward level, in a way which made me assume that they believed that I could influence them getting a higher level of service. These comments were made at the end of interviews and felt almost out of context from the earlier discourse.

As a registered pharmacist, I also have an ethical and professional obligation to highlight any concerns from interviews to the appropriate professional leads in each Trust. I explained this to participants at the outset (see interview guide). It was not an issue.

I have a breadth of experience in hospital pharmacy, having worked in large teaching hospitals in England and District General Hospitals in Northern Ireland. I have worked in a number of different roles - as a rotational, on-call pharmacist, a radio-pharmacist, a clinical pharmacist in care of the elderly, surgery, haematology, bone marrow transplantation and palliative care. I have also worked as a Teacher Practitioner and as a hospital pharmacy manager. The strength of this is that I know the language used in the field, but I must be aware of not assuming meaning or projecting my views onto the data. I worked closely with doctors and nurses on ward-based multi-disciplinary teams for over ten years, and now work closely with medical and nursing colleagues in a management role. I also have experience of being a patient in an acute hospital. In my current role, I want to lead on and influence practical changes which will make sure that medicines are used well in hospitals, both for patients and the healthcare professionals involved. I am particularly interested in systems-working, how healthcare professionals interact and how this impacts on day-to-day practice. I am aware, from experience, that using medicines is a complex process at which people are at the centre. I want to understand more about this and that has influenced my choice of research project. However my experience and views could influence what I hear in the interviews, how I interact with participants and how I code and analyse the data. To minimise this influence, I have adopted a reflexive approach. This includes, being open about my background and interests in this statement; using a structured methodology (Strauss and Corbin 1998) to help to reduce subjectivity; recording interviews and transcribing them verbatim and using memos; writing comments and concerns in a researcher diary, in which I regularly reflect on my thinking and whether I need to take a step back, how I carried out interviews, the questions I used, whether I influenced participants; and sharing and discussing recordings and coded transcripts with my research supervisors. I also have put myself in participants' shoes when writing up the research, taking care to protect their anonymity in my quotations and references as well as trying to be true to the essence of what they said. I have listened to interviews a number of times to help with this. Just before I started data collection, I trained as a coach. I had practical training on asking open

questions, listening and asking powerful questions, with supervised practice. This, I believe, gave me an increased sensitivity when interviewing participants- although I did not always get it right!

My early career research was quantitative and although I did some qualitative research in education, my current research has been a completely new experience, with wide learning in qualitative methodologies and getting used to a new language, which took some time. I also have tried to use the first person singular ('I') in my thesis where appropriate to place me in the work. I realise also that I have developed as a researcher through my interactions and presentations at the University of Bradford, becoming more involved with local practice research and linking with the wider research community through conferences and tools such as ResearchGate. This greater awareness of the literature and of research thinking will further develop my role and approach to using medicines safely and appropriately. I particularly want to continue to build upon this through further development of an academic practice unit in my Trust.

Appendix 2 Non-committal outline literature review (first)

Search strategy

1. I accessed specific databases as outlined below. The search strategies used on the following pages.

Databases	Platform	Dates carried out
Medline	EBSCO host	18- 25 January 2015
CINAHL	EBSCOhost	January 2015
Web of Science	Web of Science	January 2015

In approaching this literature search I sought the advice of the subject librarian at the University of Bradford.

Medline (1990- January 2015)

Search Term	Results
1 "Medicines Management"	294
2 "Medicines Optimisation"	6
3 (MH "medication system, hospital")	1937
4 (MH "qualitative research") OR "qualitative"	15
5 1 OR 2	299
6 4 AND 5	3,310,727 (SmartText)
7 3 AND 4	33
8 MM "Medical Staff, Hospital"	13,551

10 (MH “Attitude of Healthcare Personnel”)	80,319
11 (MH “ Focus Groups”)	19,042
12 ‘Grounded Theory’	6490
13 ‘Phenomenology’	5314
14 ‘anthropology’ OR (MH ‘Anthropology, cultural’)	4376
15 (MH ‘Narration’) OR ‘Narration’	5984
16 (MH ‘Interviews as Topic’)	43,028
17 4 OR 12 OR 13 OR 14 OR 15 OR 16	78,006
18 1 OR 2 OR 3	2,231
19 17 AND 18	47
20 (MM “Prescription drugs/AD/AE/CT/DU/ST/SD/TU/TO”) – limiter English Language	2323
21 (MM “Patient Care Team”) AND (“Nursing, Team”) AND (MM “Institutional Management Team”) AND (MM “Hospital Rapid Response Team”) AND (MM “Secondary Care”) – limiter English Language. Boolean and SmartText searching.	92,684
22 20 AND 21	0

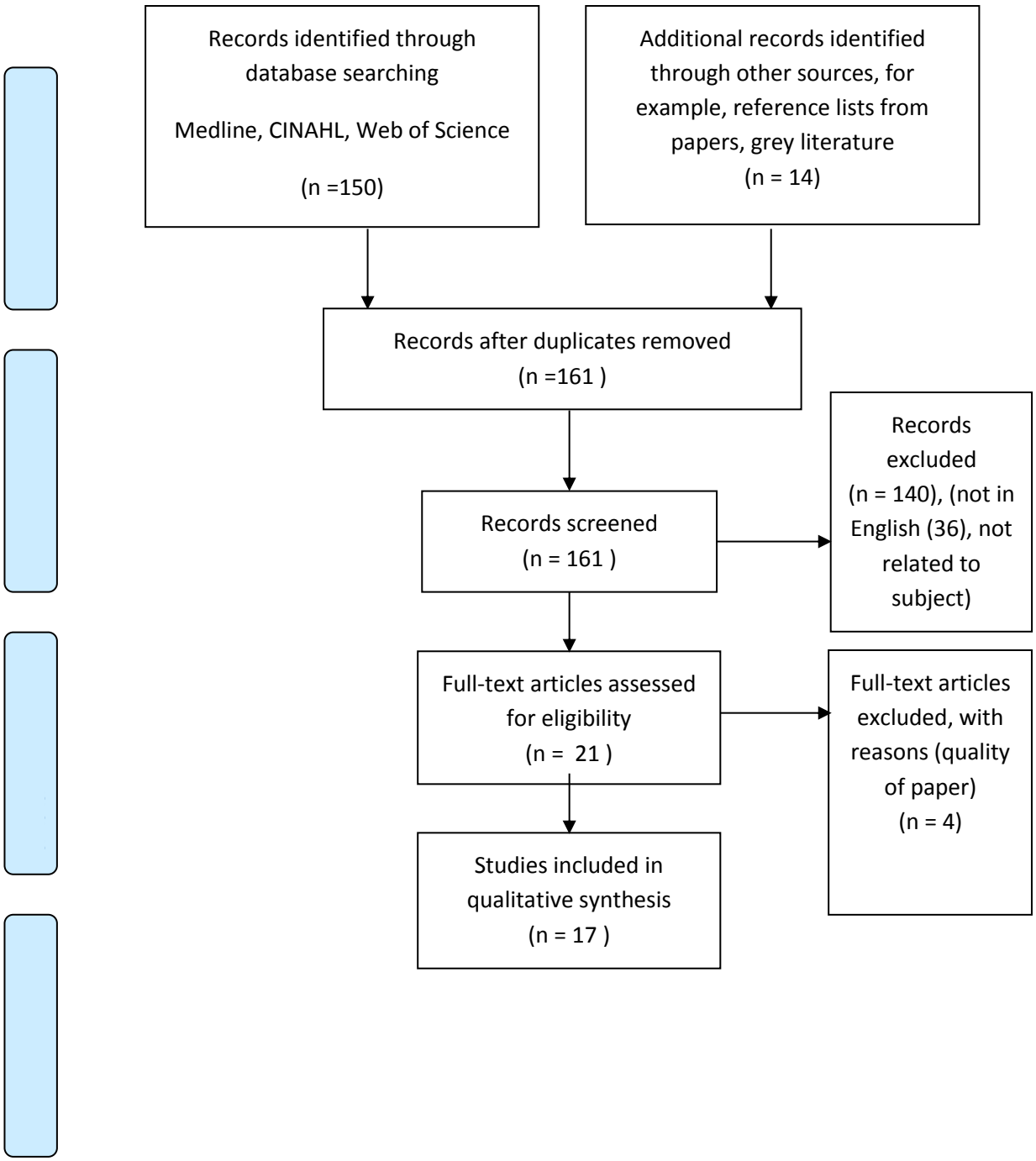
Inter-professional working and medicines management

Medline and CINAHL (Years: January 1990 – January 2015)

Search Term	Results
1 Inter-disciplinary	58,771
2 Inter-professional working	458
3 Inter-professional relationships	102
4 Multidisciplinary team	1402
5 1 OR 2 OR 3 OR 4	60,556
6 Medicines management	6,287
7 Medicines optimisation	204
8 6 OR 7	6487
9 5 AND 8 (English)	103 (77)

PRISMA 2009 Flow Diagram

Non-committal Outline Literature Review (first)



Appendix 3 Integrative literature review (second)

A second, systematic, literature review was carried out following generation of the theory. This was used to situate the theory in the current literature as well as identify if my research had filled any gaps in the field.

Search Strategy

I searched the literature as follows:

2. I accessed specific databases as outlined below. The search strategies used are on the following pages.

Databases	**Platform**	**Dates carried out**
Medline	EBSCO host	September – December 2018.
CINAHL	EBSCOhost	September – December 2018.
EMBASE	Elsevier	December 2018 – January 2019.

I set up search alerts on EBSCOhost to ensure the searches remained up-to-date. I searched databases with no date restrictions initially, but narrowed these dates to the last 20 years, English Language and Full Text if there were too many references initially.

3. I also used Summon, the University of Bradford's search engine which provides access to the 'scholarly material' at the University of Bradford.

4. I accessed references from the reference lists of primary papers, review papers, as well as articles which had cited these references and publications from individual researchers.
5. I used specific textbooks, especially key texts on research methodologies and Grounded Theory.
6. I accessed the grey literature available on the websites of the following organisations:
    - Department of Health and Social Care and Department of Health Northern Ireland www.gov.uk and www.health-ni.gov.uk
    - General Medical Council (GMC)
    - Kings Fund
    - National Patient Safety Agency (NPSA)
    - National Institute for Health and Care Excellence (NICE)
    - Nursing and Midwifery Council (NMC)
    - Pharmaceutical Society of Northern Ireland(PSNI)
    - Royal College of Nursing (RCN)
    - Royal Pharmaceutical Society of Great Britain (RPS)

I also had short email correspondence with Zubin Austin, a Canadian professor, who has published in the area of pharmacy education and personality traits.

I critically assessed articles for use in my thesis by using a critical appraisal tool (Mukadam *et al* 2011). I have populated this tool below for the key papers used in the discussion. I also accessed key texts, for example, Reason (2000), which set out seminal or new thinking on subject areas and have been widely used in the field.

Database Search Strategies

Systematic literature searches were carried out using Medline- using MESH (Medical Subject Headings) and non- MESH terms, CINAHL Plus with Full Text and EMBASE.

Search strategy – Medicines management/optimisation, qualitative research, categories – CINAHL Full Text

(Searches carried out between September 5th and November 23 2018) (Years, when restricted, 1998 -2018)

Search Term	**Results**
1 (MH " medication management")	373
2 "Medicines Management"	1971
3 1 OR 2	2323
4 "Medicines Optimisation"	196
5 (MH 'medication systems')	1758
6 (MH 'qualitative studies')	92,779
7 3 OR 4 OR 5	4144
8 6 AND 7	144
9 (MH 'Focus Groups')	37,135
10 (MH Grounded Theory')	13,945
11 (MH 'Phenomenological research')	13,685
12 (MH 'Narratives')	15,673
13 (MH "Semi-Structured Interview") OR (MH "Interviews") OR (MH "Structured Interview")	190,076

14 6 OR 9 OR 10 OR 11 OR 12 OR 13	250,119
15 7 AND 14	324
16 (MH "Decision Making, Clinical")	25,901
17 7 AND 16	54
18 “prioritising resources”	0
19 “prioritising resources” (smart text)	66
20 7 AND 19	0
21 “checks and balances”	76
22 7 AND 21	0
23 “Checks”	3,014
24 “Checking process”	17
25 22 OR 23 OR 24	3,089
26 7 AND 25	12
27 “working together”	2108
28 7 AND 27	3
29 (MH ‘Teamwork’)	13,633
30 (MH "Interprofessional Relations") OR (MH "Joint Practice") OR "interprofessional collaboration"	24,194
31 (MH "Multidisciplinary Care Team")	37,144
32 27 AND 29 AND 30 AND 31	3,089
33 7 and 32	12

Search Strategy – Medicines management/optimisation, qualitative research, categories - Medline

(Searches carried out between September 5th 2018 and 2 January 2019)

(Years, when restricted, 1998 -2018)

Search Term	**Results**
1 "Medicines Management"	10,786
2 "Medicines Optimisation"	483
3 (MH "medication system, hospital")	11,245
4. (MH "qualitative studies")	60,250
11 (MH " Focus Groups")	25,720
12 (MH "Grounded Theory")	1061
13 (MH "Phenomenology")	53
14 (MH "Anthropology")	3,251
15 'narration'	7,809
16 (MH "Interviews") OR (MH "Semi-Structured Interview") OR (MH "Unstructured Interview") OR (MH "Structured Interview")	60,584
17 4 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16	37,454
18 1 OR 2 OR 3	18,759
19 17 AND 18 (Restricted to English Language and published between Jan 1998 – December	27

2018).	
20 (MH "Decision Making") OR (MH "Decision Making, Clinical")	86,104
21 18 AND 20	15
22 “prioritising resources” (smart text)	168
23 18 AND 22	0
24 “checks and balances”	225
25 “checks”	7,771
27 18 AND 24 AND 25	2
28 “working together”	2,908
29 18 AND 28	11
30 (MH "Teamwork")	46
31 "teamwork and collaboration"	162
32 (MH "Multidisciplinary Care Team") OR (MH "Research, Interdisciplinary")	52,662
33 "inter-professional working AND inter-professional collaboration	6,044
34 "inter-professional collaboration" OR (MH "Interprofessional Relations")	49,940
35. (MH "Multidisciplinary Care Team")	49,802
36. 28 OR 30 OR 31 OR 32 OR 33 OR 34 OR 35	53,090
37. 18 AND 36 (Restricted to English Language and	149 (98)

published between Jan 1998 – December 2018).	
38. Power (psychology)	12,054
39. 18 AND 38 (Restricted to English Language and published between Jan 1998 – December 2018).	26 (21)
40. “Power theory”	21
41. 18 AND 40	0

Search strategy - Risk Management – CINAHL Plus with Full Text

(Search carried out on 3 December 2018) (Years: 1998- 2018)

Search Term	**Results**
1 (MH “Risk Management” (IOWA NIC)+”) OR (MH “Risk Management +”) OR “managing risk ”	17,320
2 risk management	20,682
3 1 OR 2	25,710
4 (MH “Grounded Theory”) OR “grounded theory”	14,142
5 3 AND 4	104
6 “medicine” OR (MH “Medicine+”)	301,640
7 (MH “Medication Errors+”) OR	111,767

“medication”	
8 6 OR 7	403,187
9 5 AND 8	12
10 (MH “Medication Errors+”) OR “medication errors”	13,471
11 4 AND 10	17
12 (MH "Medication Management") OR "medication management" OR (MH "Medication Management (Iowa NIC)") OR (MH "Medication Managements (Iowa NIC)+")	2,079
13 4 and 12	17
14 (MH "Risk Assessment") OR "risk"	680,608
15 4 AND 8 AND 14	104
16 5 OR 15	197
17 16 NOT 5	93
18 9 or 11 or 13	44

Search strategy - Risk Management – Medline

(Search carried out on 3 December 2018) (Years: 1998- 2018)

Search Term	**Results**
1 (MH “Risk Management” (IOWA NIC)+”) OR (MH “Risk Management +”) OR “managing risk ”	240,692
2 risk management	37,896
3 1 OR 2	262,324
4 (MH “Grounded Theory”) OR “grounded theory”	9,271
5 3 AND 4	194
6 “medicine” OR (MH “Medicine+”)	3,779,397
7 (MH “Medication Errors+”) OR “medication”	235,871
8 6 OR 7	3,922,309
9 5 AND 8	80
10 (MH “Medication Errors+”) OR “medication errors”	12,849
11 4 AND 10	22
12 (MH "Medication Management") OR "medication management" OR (MH "Medication Management (Iowa NIC)") OR (MH "Medication Managements (Iowa NIC)+")	2,585
13 4 and 12	13

14	(MH "Risk Assessment") OR "risk"	1,780,112
15	4 AND 8 AND 14	377
16	5 OR 15	507
17	16 NOT 5	309
18	9 or 11 or 13	108

EMBASE

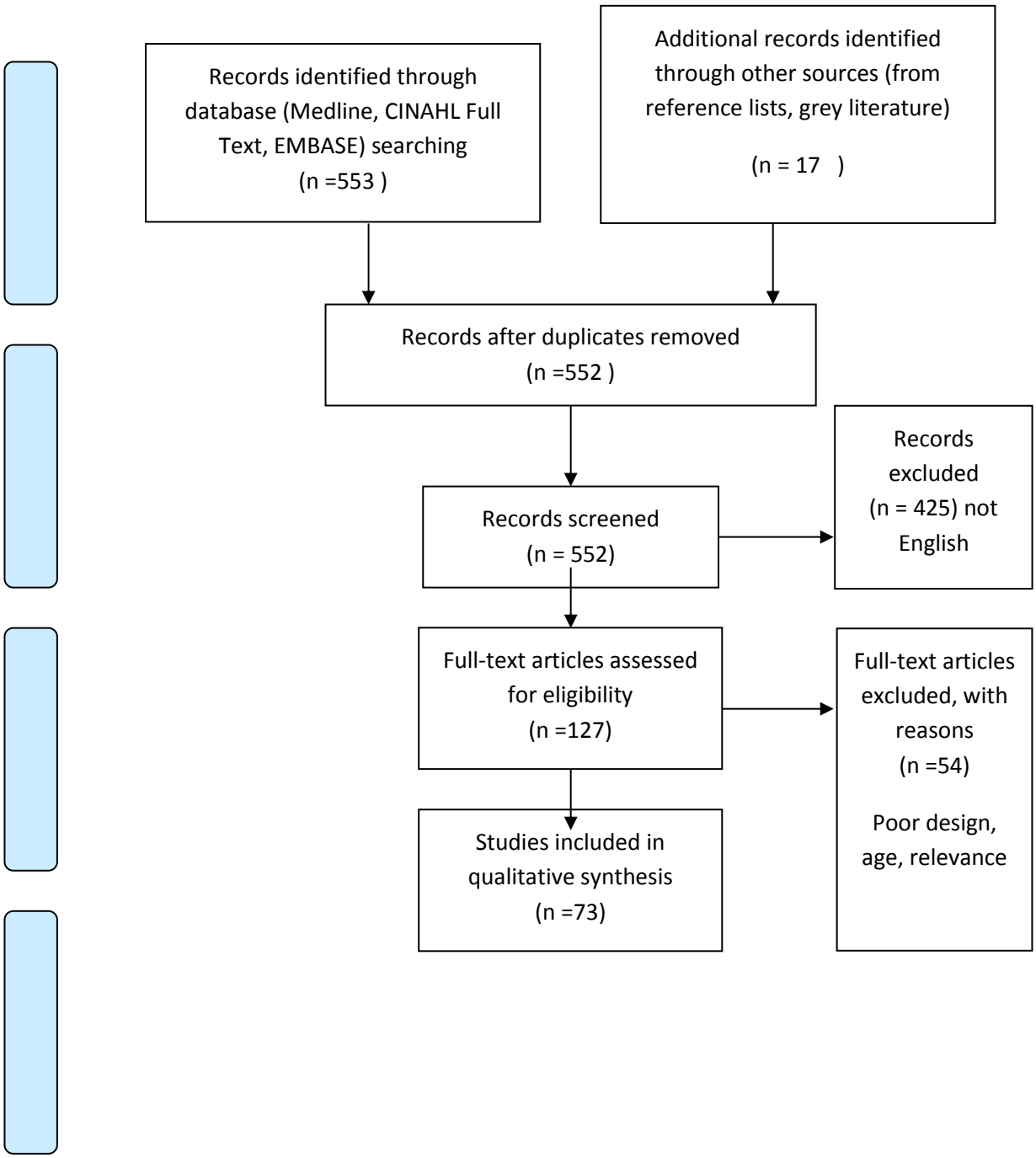
Search strategy (Search carried out on 2 January 2019)

Search Term	**Results**
'medicines management' OR 'medicines optimisation'	1511
('medicines management' OR 'medicines optimisation') AND ('interprofessional collaboration'/exp OR interprofessional)	19
('medicines management' OR 'medicines optimisation') AND ('risk management'/exp OR 'risk management' OR 'risk sharing, financial' OR 'managing risk')	25
'medicines management' OR 'medicines optimisation'	1511
('medicines management' OR 'medicines optimisation') AND ('interprofessional collaboration'/exp OR interprofessional)	19
('medicines management' OR 'medicines optimisation') AND ('risk management'/exp OR 'risk management' OR 'risk sharing,	25

financial' OR 'managing risk')	
('medicines management' OR 'medicines optimisation') AND ('risk management'/exp OR 'risk management' OR 'risk sharing, financial' OR 'managing risk' OR 'risk'/exp OR 'risk' OR 'risk hypothesis')	353
('medicines management' OR 'medicines optimisation') AND ('risk management'/exp OR 'risk management' OR 'risk sharing, financial' OR 'managing risk' OR 'risk'/exp OR 'risk' OR 'risk hypothesis' OR risk) AND ('qualitative research'/exp OR 'qualitative research' OR 'qualitative studies' OR 'qualitative study' OR 'grounded theory'/exp OR 'grounded theory' OR qualitative OR 'focus groups' OR 'phenomenology'/exp OR 'phenomenologic research' OR 'phenomenological research' OR 'phenomenological study' OR 'phenomenology' OR phenomenology OR narration OR narrative OR 'interview'/exp OR 'interview' OR 'interview guide' OR 'interviews' OR 'interviews as topic' OR interview* OR 'ethnography'/exp OR 'ethno geography' OR 'ethnography' OR ethnograph*)	67

PRISMA 2009 Flow Diagram

Second Literature Review



Appendix 4 Assessment of quality of some of the key papers used in the second literature review

Checklist (Mukadam *et al* 2011)

				Quality Score (indicators differ for qualitative and quantitative studies) *see key below.						Comments
Paper and Country	**Type of Study**	**Sample**	**Number of Participants**	**1**	**2**	**3**	**4**	**5**	**6**	
Ashcroft, D. *et al* (2015). England. Prevalence, nature, severity and risk factors for prescribing errors in hospital Inpatients.	Quantitative, large, prospective study.	All newly prescribed or rewritten inpatient medication orders as part of their usual practice (hand-written and electronically prescribed). Grade of prescriber and prescribing errors noted (validation panel).	26,019 patients with 124,260 medication orders across 20 UK NHS hospitals.	1	1	1	1	1	0	Data collected on 7 days one month apart. Data collectors were trained and data collection information book. Two error validation panels. Pharmacists may have under-reported errors.

Borrott, N. *et al* (2017) Australia. Medication communication between doctors and nurses for paediatric acute care.	Qualitative ethnographic study using semi-structured interviews, focus groups and observations.	Three different wards in a tertiary, paediatric teaching hospital. Nurses and doctors who worked 1 day per week in paediatrics.	40 nurses interacted with 30 doctors -200 hours of recorded observations. 6 focus-groups (59 nurses, range of experience). One-to-one interviews – 7 doctors, 11 nurses (range of experience).	1	1	1	0	1	0	Inclusion and exclusion criteria. Methods to reduce intrusiveness of observations. 'General schedule' for data collection. Model used for thematic analysis. Themes discussed among team members and consensus reached.
Dixon-Woods, M. *et al* (2014). England. Culture and	Large, mixed-methods study. Triangulation of data from a range of sources.	Data summarised from 7 separate sub-studies. Interviews, ethnographic observation, surveys, focus groups and documents.	Very large. Total of 304 semi-structured interviews. 650 hrs observation. 715 cross-sectional	1	1	0	0	1	0	Low scoring due to lack of information. High-level summary. No formal protocol but "interpretive, narrative approach." Full information on methods or data not provided. Limited

Behaviour in the English National Health Service: overview of lessons of a large, multimethod study.	"Interpretive and narrative synthesis of findings."		survey responses. 793 sets of minutes plus other data.							primary data (due to quantity) – available in second report. Authors describe "careful data scrutiny, extensive discussion and detailed analysis of themes" - believe provided rich and powerful picture.
Dornan, T. *et al* (2009). England. EQUIP final report - An in depth investigation into causes of	Mixed methods approach with triangulation and synthesis of results from four methods used. See comments section for methods used.	One-to-one interview sample: Purposive (not representative) sample – 'maximum variability sample.' Different ethnicities from variety of medical schools and both genders. Email and presentations used	30 FY1 doctors interviewed from 68 who returned recruitment questionnaires. 14 worked in teaching hospital / 16 in a District General Hospital. Covered 18 out of 31 UK	1	1	1	0	1	0	Methods included 3 systematic literature reviews (note letter by Dean 2010 on published review 2009), a large empirical evaluation of the prevalence and nature of prescribing errors made by FY1 trainees (range of educational backgrounds)- published by Ashcroft *et*

prescribing errors by foundation trainees in relation to their medical education. EQUIP study.	Used Reason's theory of error causation – recognised approach.	to seek participants.	medical schools. 17 different hospital sites. 85 errors discussed.							*al* 2015, qualitative, one-to –one interviews using a critical incident approach, and telephone interviews of medical school leaders. Note report for the GMC – not published in journal. Interview schedule used. Panel discussion of errors.
Higgins, M.P. and Tully, M. (2005). England. Hospital doctors and their schemas about appropriate prescribing.	Qualitative preliminary, cross-sectional study with purposively selected sample (range of experience) using a modified Grounded Theory	7 pre-registration (FY1 doctors),5 senior house officers FY2 doctors) and 5 consultants from different medical specialties in a teaching hospital	17 doctors	1	1	1	1	0	0	Interviewer carried out main analysis but two researchers read the interview transcripts and discussed analysis. Contains quotations from participants.

	approach.									Limitations- excluded alternative ‘paradigms of psychological research.’
Hignett, S. *et al* (2018). United Kingdom.	Mixed-methods –pre- workshop survey and subsequent discussion of themes at workshop. NVivo analysis.	Work-shop delegates: 33% doctors 33% nurses 16% Allied Health Professionals 8% pharmacists 3% dentists 4% others.	330 survey responses. Work-shop delegates – provided direct healthcare (n=135), managers (n=76), support staff (n=35). 63% from acute sector.	1	1	1	1	0	1	Limitations – participants were self-selecting both in attending the workshops and completing the on-line survey. Survey was piloted. Different workshop locations -poor attendance registers kept. Generation of codes until ‘theoretical saturation.’ GT not stated. No additional data recorded form the workshop discussions. Higher level codes were presented to healthcare audiences – external validity.

Hrissos, S. and Thomson, R. (2013). England. Do approaches to involving patients in improving their safety risk damaging trust between patients and healthcare professionals?	Qualitative study using semi-structured interviews. Purposive sampling of participants and wards (frame used) Grounded theory approach.	Patients, carers and healthcare professionals in general medical and surgical wards in two English hospitals.	16 patients, 4 relatives (mead age 60 years (sd 15): 12 female, 8 male). 39 healthcare professionals – 11 doctors, 12 nurses, 9 pharmacists, 7 healthcare assistants.	1	1	1	1	1	0	Part of a wider qualitative study. Semi-structured topic guide. Inclusion/exclusion criteria. Interviews in patients/ carers homes. Project team discussed findings and included patient representatives. Key themes not a grounded theory discussed.
Lewis, P.J. and Tully, M. (2009).	Qualitative study using the critical incident technique and in-depth	12 hospitals – all doctors invited to participate. Purposive sampling frame (32 doctors) - different experiences, followed by	48 doctors who reported 193 uncomfortable prescribing	1	1	1	1	1	0	All authors read the critical incidents, discussion and consensus reached.

England. Uncomfortable prescribing decisions in hospitals: the impact of teamwork.	interviews. Grounded Theory approach to data analysis	theoretical sampling (16 doctors).	incidents.							
Manias, E. *et al* (2015). Australia. Complexities of medicines safety: communicating about managing medicines at transitions across ED and medical wards.	Qualitative, descriptive study using in-depth, semi-structured interviews and focus groups. Thematic analysis.	Health professionals (doctors, nurses or pharmacists) working at least one day a week in Emergency Dept (ED) or medical wards. Stable, adult patients presenting to ED and family members of patients in ED or medical wards.	10 patients and 10 family members interviewed. 83 healthcare professionals (57 nurses, 15 pharmacists, 11 doctors) – 12 focus groups and 3 individual interviews.	1	0	1	1	1	1	Data collection until repetitive findings. Only English speaking patients and family were recruited. Time pressures to interviewing. Audio-recorded. Rigor-memos, minutes and field notes. Triangulation between patients, family and professionals.

Rixon, S. *et al* (2015). Australia. Pharmacists' inter-professional communication about medications in Specialty Hospital settings.	Qualitative study using semi-structured interview and observations of pharmacists, nurses and doctors. Detailed thematic analysis.	Pharmacists, nurses and doctors working in a range of clinical settings. Sampled through information sessions, referrals from clinical staff and direct approach.	73 individuals: - 21 participants working in a range of clinical specialties in a large teaching hospital. 76 observations of 56 individuals in similar settings. 13 pharmacists 46 nurses 14 doctors.	1	1	1	0	1	0	Used a 5-stage thematic framework to analyse the data. Data analysis by first author and discussed by team to reach consensus. Quotations from participants included in the text. 4 different interviewers.
Ryan, C. *et al* (2014). Scotland.	Mixed-methods study using prospective observations, semi-structured	All doctors prescribing in 8 purposively selected Scottish hospitals and wards.		1	1	1	0	1	1	Statistical power calculations. Comprehensive pilot

Prevalence and causes of prescribing errors: prescribing outcomes for trainee doctors engaged in clinical training (PROTECT)	interviews and cross-sectional survey. Reason's model of accident causation used.	Wards had at least one fy1 doctor who prescribed and a clinical pharmacy service.								(observational study). Reliability of pharmacists' routine error reporting was checked in 10% of samples.
Scullin, C.*et al* (2011). Northern Ireland. Integrated medicines management – can routine implementation improve quality?	"Naturalistic experiment" using quantitative methodology and statistical analysis.	Two hospitals – potential under-reporting of pharmacy interventions. Concerns expressed regarding control of 'processes due to naturalistic setting.	1049 patients recruited with 833 patients analysed. Authors commented on need for a larger sample size.	1	0	1	0	1	0	Measured outcomes from a new service. Concerns re controlling approach in naturalistic setting. Not clear about how patients were chosen. 'Control' and intervention groups – note latter may not have got full intervention. Cannot fully attribute to the new service.

Seden, K. *et al* (2013). England. Cross-sectional study of prescribing errors in patients admitted in nine hospitals across North West England.	Quantitative study, prospective data collection. Multivariate analysis of data.	Nine hospitals, each asked to audit a minimum of 400 prescriptions (empirical choice of numbers – related to a previous study). Nominated ward-based pharmacists collected data as part of their routine work.	Number of participants 4238 prescriptions were evaluated.	1	1	1	1	1	0	Numbers to compare with EQUIP study. Training of data collectors not mentioned but standardised data-collection tool used. Looked at errors on whole prescription as well as individual errors.
Wilson, A.J. *et al* (2016). Australia. Inter-professional collaborative practice for patient safety: nursing, pharmacy and medical graduates'	Qualitative study	Convenience sampling to recruit nurses, interns and pharmacists.	68 participants:- 28 nurses 17 interns 23 pharmacists.	1	1	1	1	1	0	

experiences and perspectives.										

Key to quality assessment scores (1-6) for quantitative and qualitative studies (Mukadem, N. *et al* 2011)*

	Quality assessment tool for quantitative studies	**Quality assessment tool for qualitative studies**
1.	Was the target population defined by clear inclusion and exclusion criteria?	Were the aims of the research clearly stated?
2.	Probability sampling used to identify potential respondents (or whole population approached)?	Was a clearly defined method of recruitment used? Were there inclusion/exclusion criteria?
3.	Did characteristics of respondents match the target population *i.e*. was response rate >80% or appropriate analysis included comparing responders and non-responders?	Was the process of data collection and analysis explained clearly? Was data collection standardised?
4.	Were data collection methods standardised?	Did the researchers attain saturation of data?
5.	Was the measure used valid?	Was the process of data analysis sufficiently rigorous, *i.e.* at least two raters, some method of resolving discrepancies?
6.	Was the measure used reliable?	Have the findings been validated by participants?

Note Mukadem, N. *et al* (2011) used papers which scored 4 or above in their literature review. I have done the same.

Appendix 5 Outline interview guide for initial one-to-one interviews

Outline interview guide	
Introduction Hello – my name is Anne Friel and I am a Doctor of Pharmacy student at the University of Bradford. Thank you for agreeing to be interviewed as part of my research study. The aim of the research is to produce a theory which explains how doctors, nurses and pharmacists work to optimise the use of medicines in acute hospital settings in Northern Ireland. Can I confirm that you have received written information on this study and that you have given your consent to participate? You know that you do not have to answer all of my questions and may withdraw from the study at any time.	

The information which you give me will be treated confidentially. However as I am also a registered pharmacist I have a professional obligation to highlight to the relevant Trust professional lead any concerns raised during the interview which may directly impact on patient safety.	
Demographic Information Name Best way to contact you – to check the transcript of the interview, share results of the research. I will not use your name to directly identify your interview transcript. I will use a code. Profession: How many years have you worked as a doctor/nurse/pharmacist?	
Initial questions I would like to understand your experience in your own words without imposing my words on you. So I might ask for more detail from	

time to time but I will not ask lots of questions. I am interested in your personal experience of working with medicines in hospital Tell me about your role(s) working with medicines in hospital? Describe what impacts on and influences your approach to working with medicines. Can you tell me how you interact with other healthcare professionals when working with medicines? Can you tell me how your role or the roles of others with medicines has changed over the last number of years? What did you think then? Can you tell me about the most important learning you have had from your work with medicines? What helps you to manage your work with	

medicines? How has your professional training prepared you for working with medicines? Professional barriers/ approach	
Prompt questions Tell me about / could I ask you what that is like for you? What does that mean for you? What were you thinking? Who influenced your actions? Could you say something more about that? I would now like to introduce another topic…	
Closing Comments	

I'd like to draw the interview to a close. Is there anything which you would like to say that you have not had an opportunity to? Thank you for taking part. I appreciate having this opportunity to talk to you. I will be typing up the transcript of this interview for analysis. Would you like to read through it for accuracy purposes? If you have any further questions please contact me or….	
Manually record any additional comments made by the participant after the tape-recorder has been switched off- keep separate for analysis purposes.	

Additional questions added to subsequent interviews (theoretical sampling):

- What information do you use (or seek)when making decisions about medicines?
- What is your and other professionals' responsibility with respect to medicines in acute hospitals?

- What informs your prescribing decisions? Just checking out some comments from others – they describe a holistic assessment – is there time for that, is evidence-base foremost?
- What are the drivers in your use of medicines? For example, discharge, flow, medium term thinking- system
- How do you work as an autonomous healthcare professional when working as a member of a multi-professional team? What are you accountable for with regard to medicines?
- How has your approach to using medicines changed with experience?
- Talk me through the things which go through your head when reviewing a patient's medicines. , for example
- Ask about the weight of responsibility of roles.
- Explicit knowledge – do you have access to all information – what information do you use to make decisions?
- What kind of skill is prescribing?
- What words would you use to describe other healthcare professionals' roles with medicines?
- How do you get information from patients relating to medicines use and the effects of medicines?
- Where does prescribing sit among the roles of the doctor?
- How can I explore this with other healthcare professionals – the relative importance given to medication and getting it right?
- How are healthcare professionals trained with regard to making decisions which affect patients' lives? Are junior doctors trained any differently to do other practical things as opposed to prescribing? Is prescribing a practical thing or a higher order thinking process?
- Test out- fast paced world – make bolder decisions regarding medicines dosing to expedite discharge.

Appendix 6

An armchair walk-through (Richards and Morse 2007)

I am interested in exploring the perceptions or beliefs which healthcare professionals have of their roles in medicines optimisation. Doctors, nurses and pharmacists are involved in this process. The process has developed to include pharmacy technicians (not registered in Northern Ireland), as well as newer non-medical prescribers including physiotherapists, optometrists and chiropodists. The role of nurses and pharmacists has changed with respect to prescribing. My focus is on medicines optimisation on acute hospital wards and this involves the traditional three professional groups only. Will I look at a sub-section of nurse and pharmacist prescribers? I will not plan to include pharmacy technicians- but may there be a subculture in general of non-registered staff seeing a role in optimising medicines (maybe don't close the door on exploring this at this stage). There is variation between doctors, nurses and pharmacists with respect to grade, years of experience, range of experience and training. Do I look at sub-groups, for example, newly qualified professionals and professionals trained more than 20 years ago (I would need to choose the number of years for a reason, for example when training methods changed). I want to hear perceptions which may impact on current practice – do I want to look at variation and how important is that? Eventually I need a homogeneous sample? I think I will start by having one-to-one interviews with a member of each of the three professions with at least one year's acute hospital ward experience (so that their views are based on experience as opposed to being solely theoretical) and a member of each of the three professions who has been practising for more than twenty years. Initial convenience sampling however means involving, "experts" at the start to get an overall feel for the process. All of these individuals will be, "experts" to differing degrees as they have at least one year's experience of working with medicines and their different levels of experience will allow me at the outset to, "define boundaries" to see whether I should explore further different views of professionals with different levels of experience. (Six one –to-one interviews – convenience sample –not from my Trust).

Appendix 7 Memo – pilot interview (1.4.18)

I looked at the pilot interview which I had carried out on 25 July 2016 with a pharmacist in a different hospital who I had worked with 10 years ago. I had planned to use this interview solely to test my interview technique and whether the initial questions made sense, to give me confidence. However, there is rich data in the interview which develops and provides greater depth to some of the categories.

I cannot find a reference to this in the literature, mainly because pilot studies are rarely used in grounded theory methodology.

I have not looked at the pilot interview at all until now. Its content has not contributed to the coding and analysis of the data. However at this late stage, I have gone back to the interview to see what was said and have included some direct quotations in areas which already exist.

Further thoughts – December 2018

I have discussed whether to include the codes and quotations from the pilot interview in the theory and in my findings with my supervisors. There are a number of points to balance:

1. I know and used to manage the pilot participant. The individual works in a different Trust and I have no management responsibilities and do not attend meetings with the individual now.

2. The individual has a wide range of experience of working with medicines at different levels and this adds to the richness of the data.

3. The pilot interview was structured and formal. The individual gave informed consent at the outset. I double-checked that she was happy for me to use the data from her interview in my analysis and findings. She has read through the Findings chapters and is happy with this. It could be argued that the individual was more open and free with her views than other participants who had never worked with me, but I believe this would add to the richness of the data.

4. The individual works to a high moral, professional and ethical code.

5. I did not code and analyse the pilot interview until I had coded and analysed all of the other 16 interviews. Therefore the data from the pilot did not shape the theory but added depth to the findings.

I have decided to use the data from the pilot interview and this is made transparent in laying out the theory. I believe that inclusion of the data from this interview adds to the depth and richness of the Theory.

Appendix 8 Study recruitment poster

Medicines Management Research

Participants Needed

- **Are you a doctor, nurse or pharmacist with experience of using medicines as part of your role?**
- **Do you work in an acute hospital?**

If your answer is **YES**, volunteer to be part of an important research study looking at how we use medicines in acute hospitals

Participation will involve taking part in a

30 minute interview at your hospital

Interested?

Please contact for further information **Anne Friel** at anne.friel@westerntrust.hscni.net

OR

Tel: 02871296116

Monday – Friday

8.30am – 5pm

Thank you

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Appendix 9 Information sheet for interview participants

Version 1 7th March 2016

Information for Interview Participants

Project Title: An investigation into how doctors, nurses and pharmacists work to optimise the use of medicines in acute hospital settings in Northern Ireland using a grounded theory approach

What is the purpose of the research?

The purpose of the research is to find out how doctors, nurses and pharmacists work with medicines in acute hospitals in Northern Ireland. The research findings may help to improve how we use medicines in hospitals.

Why have I been chosen?

You have been chosen as a healthcare professional who prescribes, administers or dispenses medicines to treat patients in hospital as part of your role. You have been chosen as a member of your peer group.

Do I have to take part?

Participation in this research is totally voluntary. Not participating will have no negative consequences. You can choose to withdraw your participation in the research at any stage and we can discuss whether the interview data collected up until then can be used or not. You can choose not to answer specific questions during the interview process.

What do I have to do?

You will participate in an unstructured interview with me; this will last for no more than 30 minutes. The methodology I will use is known as 'grounded theory' therefore I will guide the discussion but will not ask a lot of set questions

The interview will be recorded with your permission.

What I am asking you to do?

- Provide basic demographic information about yourself
- Allow me to interview you at your place of work or another suitable place as identified by yourself and to audio-record the interview.
- Allow me to keep an anonymised, written transcription of the interview and the recording in a secure file for up to 12 months after I finish collecting data.

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- Read through the transcription of the interview to check that it is accurate.
- Allow me to quote anonymously from your interview in publication of this study

What happens to the information I give at interview?

An anonymised, written transcription of the interview and the recording will be kept in a secure, locked cabinet, only accessible by me. I will not use your real name and you will be able to read the transcription of the interview and agree the accuracy of its content. The code for linking the interview to you will be kept in a separate secure location.

The content of the interview will be kept confidential. However I have a professional duty of care to inform the relevant professional head of service of any points raised during the interview that I believe to impact adversely on a patient's care. We can discuss what this means for you if you wish.

What will happen to the results of the study?

A copy of the findings may be sent to you upon request.

The research findings will be written up for submission to appropriate conferences and peer reviewed professional journals.

A copy of the study outcomes will be shared with the Medical Director, Executive Director of Nursing and Head of Pharmacy at each Trust and to the Chief Pharmacist at the DHSSPS.

Who has approved the study?

This study has been approved by the University of Bradford Ethics Committee and by each Trust's Research and Development Committee.

Contact for further information

If you would like any further information please contact me by email (anne.friel@westerntrust.hscni.net) or phone 02871296116 (Monday- Friday 8.30am- 5pm).

Thank you for reading this information sheet and for considering taking part.

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Appendix 10 Participant consent form

Version 1 7th March 2016

Consent Form

Please complete this form after you have read the Information Sheet and listened to an explanation about the research.

Title of Study: *An investigation into how doctors, nurses and pharmacists work to optimise the use of medicines in acute hospital settings in Northern Ireland using a grounded theory approach.*

Thank you for considering taking part in this research. If you have any questions arising from the information Sheet or explanation already given to you, please ask the researcher before you decide whether to participate.

You will be given a copy of this Consent Form to keep and refer to at any time.

	Please initial
I confirm that I understand that by initialling each box I am consenting to this element of the study.	[ ]
I confirm that I have read and understood the information sheet dated March 7th 2016 for the above study.	[ ]
I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	[ ]
I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason and without any consequences for me.	[ ]
I have been informed that the interview will be recorded and I give my consent for this recording to be made.	[ ]
I understand that all information I provide will be treated as confidential and will be anonymised.	[ ]
I understand that any information that I give which the researcher feels will adversely affect patient care may be reported to the relevant Trust professional lead.	[ ]
I agree to the use of anonymised direct quotes from my interview in publications arising from the study.	[ ]
I agree to take part in the above study.	[ ]

Name of Participant	**Date**	**Signature**
Name of Researcher	**Date**	**Signature**

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Appendix 11: University of Bradford email and Ethics Reviewer's comments form, confirming ethics approval

From: nhs-ethics [mailto:nhs-ethics@bradford.ac.uk]
Sent: 22 April 2016 09:48
To: nhs-ethics; Friel Anne
Cc: Beverley Lucas; Alison Blenkinsopp
Subject: RE: IRAS Application - Blenkinsopp/Friel 2015/16
Importance: High

Dear Anne

IRAS Application: Blenkinsopp/Friel Life Sciences 2015/2016

Title: How HCPs work to optimise medicines in acute hospitals in NI

Your IRAS submission has now been reviewed by an internal IRAS reviewer.

I am pleased to inform you that your study has ethics approval to proceed to the NHS for consideration and ethical review.

NOTE the actions that are now required:

1) You must submit your application via the IRAS portal using the details below for the University Sponsor:
    a. Sponsor: Tamsin Holt
    b. Email: nhs-ethica@bradford.ac.uk
2) You must make sure that before submitting the documents, all your documents are consistent in regards to version numbers, etc. You may also need to contact the Central Booking Team within the NHS to confirm a reference number before you submit, please make sure any such reference numbers are included in your documents before you upload them to the IRAS portal for submission.
3) Once the documents are submitted via the IRAS portal, a notification will be received by the University Sponsor that your study needs sign off. I will notify the sponsor that we have reviewed and approved the study for ethics.
4) The University Sponsor will sign off on the study, which means your study will be submitted through the portal for review by the NHS.

Please follow the steps above. If you are unsure of anything, please contact me at your earliest convenience.

Best Wishes

Omar

UNIVERSITY of BRADFORD

Omar Ali

Research Funding Co-ordinator

RKTS, F.24 Richmond Building

	+44 (0) 1274 233112
	o.f.ali@bradford.ac.uk
	www.bradford.ac.uk

Research Professional

www.researchprofessional.com

ETHICS REVIEWER'S COMMENTS FORM

This form is for use when ethically reviewing a research ethics application form. Please note: your comments will guide the Panel in their decision and **may** be forwarded to the applicant for information.

1. Name of Ethics Reviewer:	IRAS Reviewer

2. Research Project Title:	How HCPs work to optimise medicines in acute hospitals in NI
3. Principal Investigator (or Supervisor):	Alison Blenkinsopp
4. Academic Department / School:	Life Sciences

5. Do you have any potential conflict of interest with regard to this project application. NO
If you answered YES, then please clarify:

6. I recommend that, in my judgment, the application should be:

Approved [recommended comments for information only]:	Approved once the Minor amendments required have been satisfactorily addressed [on which Chair can act]	Major amendments required - recommend to be seen by Panel	NOT be approved for the reason(s) given below:
X			

7. Reviewers comments:

[NOTE:
Required: minor or more major amendments required before approval can be given.
Recommended: recommendations will be sent to applicant for information only.]

Study design / methodology

Required:

Recommended:

Recruitment of participants

Required:

Recommended:

PRIVATE AND CONFIDENTIAL

THIS FORM SHOULD BE TYPEWRITTEN

Participant consent and information sheet
Required:
Recommended:
Risks and ethical problems
Required:
Recommended:
Compensations/Indemnity
Required:
Recommended:
Confidentiality
Required:
Recommended:
General comments
All ethical issues have been adequately addressed and the study is low risk. The only problem that could with reasonable probability arise is the disclosure of information by a participant that requires a degree of confidentiality to be broken, but the researcher has addressed this issue satisfactorily.

DATE: 22/04/2016

Appendix 12: University of Bradford confirmation of sponsorship letter (26.5.16).

UNIVERSITY of BRADFORD
Research & Knowledge Transfer Support

Miss Anne Friel
Pharmacy Department
Altnagelvin Hospital
Glenshane Road
Londonderry
BT47 6SB

26th May 2016

Dear Anne

RE:	**University of Bradford Confirmation of Sponsorship**
Study Title:	**How HCPs work to optimise medicines in acute hospitals in NI**
Chief Investigator(s):	**Alison Blenkinsopp/Beverley Lucas**

We write to you in relation to your research ethics submission for ethics approval, the title of the study noted above.

This letter confirms approval for your study to be submitted to the NHS for ethical review. The University Sponsor sign-off confirms approval from the University after internal ethics review.

Should you require anything further, please contact the University of Bradford Ethics team, contact details below.

Yours Sincerely

Tamsin Holt
University Sponsor for NHS Research

Ethics Team contact details
T: 01274 233112
E: nhs-ethics@bradford.ac.uk

University of Bradford
Richmond Road
Bradford,
West Yorkshire
BD7 1DP, UK

+44 (0)1274 236000
rkts@bradford.ac.uk
www.bradford.ac.uk/research-and-business

Appendix 13: Letters confirming Health and Social Care (HSC) Trust final research governance permission from Belfast, Northern, South Eastern and Southern HSC Trusts.

Belfast Health and Social Care Trust

Inter HSC/NHS Employee Activity Placement Agreement

For the purposes of this agreement the 'Host HSC/NHS Organisation' is the receiving organisation and the 'Originating HSC/NHS Organisation' is the usual employer of the individual staff member

The Belfast Health and Social Care Trust agree that **Anne Friel** should be engaged to work within the facilities for the period from **1 July 2016** to **31 December 2019** for the purposes of conducting the research project entitled **'An investigation into how doctors, nurses and pharmacists work to optimise the use of medicines in acute hospital settings in Northern Ireland using a grounded theory approach'**, with **Margaret McFarland** acting as **Local Collaborator.**

Name of Host Organisation: Belfast Health and Social Care Trust

BHSCT Placement Managers Details: Margaret McFarland

Name of Originating Organisation: Western HSC Trust

Employer Line Manager's Details:

The Western HSC Trust confirms that;

- There are no outstanding or current disciplinary issues in relation to the named individual that would pose a risk to patient / client safety that need to be shared with the Trust
- The named individual has completed the relevant BHSCT documentation in relation to their placement activity request e.g. Confidentiality Agreement, Health Declaration, AccessNI check (where appropriate)
- The named individual is eligible to work in the UK
- The named individual is 'fit' for duty in accordance with Occupational Health requirements
- The named individual is suitably qualified and is on the relevant live register (if applicable). *In the instance of Medical staff this must also confirm they have a relevant licence to practice.*

- The named individual has received appropriate training
- Any agreed Recharge arrangements have been put in place
- The named individual holds a valid driving licence which facilitates the relevant categories required, if applicable
- A separate form of indemnity agreement has been provided to the Trust where applicable

Belfast Health and Social Care Trust

Confidentiality Agreement for Non Trust Staff

Data Protection

Belfast Health and Social Care Trust ('the Trust') complies with the Data Protection Act 1998. Information about you and your use of any Trust systems may be included in relevant computer files and manual records held within the Trust.

During the course of your time within Belfast Health & Social Care Trust, you may acquire or have access to confidential information which must not be disclosed to any other person unless in pursuit of your duties as detailed in any data access agreement or contract between Belfast Health & Social Care Trust and you and/or your employer.

The Data Protection Act 1998 regulates the use of all personal information and includes electronic and paper records of identifiable individuals (patients, clients and staff). The Trust is registered in accordance with this legislation.

Confidentiality

While carrying out your role you must be aware that you may have access to and be entrusted with information in respect of the services, business and financing of the Trust and its dealings, transactions and affairs, all of which is or may be confidential. Confidential information includes all information relating to the business of the Trust and its patients/clients and employees.

All Notes and memoranda or any intellectual property or confidential information concerning the business of the Trust which shall be acquired, received or made during the course of your placement with the Trust shall be the property of the Trust and shall be surrendered by you to someone duly authorized in that behalf at the termination of your placement or at the request of the Trust Board at any time during the course of your placement.

During or after the period of your placement you will not divulge to any person whatsoever or otherwise make use of (and shall use your best endeavours to prevent the publication or disclosure of) any trade secret or any confidential information concerning the business or finance of the Trust or any such confidential information. Any breach of this confidence may result in you and/or your employer being subject to legal action.

Western HSC Trust

Signed:

Name: *Geraldine McKay*

Position: *Director of Acute Services, WHSCT*

Date: 16.08.16

Placement Individual

Signed :

Name: *Anne Friel*

Position: *Head of Pharmacy & Medicines Management/ Research Student*

Date: *13.6.16*

BHSCT Local Collaborator

I confirm agreement to facilitate the above individual's placement within the Trust. I will formally check their personal ID and provide any local departmental induction required for the placement individual on arrival to the work area.

Signed:

Name: *Margaret McFarland*

Position: *BHSCT Local Collaborator*

Date: 15/Aug/2016

BHSCT Research Office

Signed:

Name: Alison murphy

Position: Research manager

Date: 22/8/16

Belfast Health and Social Care Trust

Health Declaration

Pre-Placement Health Assessment

Thank you for the interest you have shown in visiting the Belfast Health and Social Care Trust on placement activity.

As you may come in contact with patients/clients, it is important that your health does not pose any risks either for yourself or the patients, clients and staff of the hospital. I would therefore be grateful if you would consider if any of the following situations are relevant to you:

- If you are currently suffering from an infectious illness such a Chicken Pox, Measles or German measles (rubella), T.B., or a flu-like illness
- If you have recently been in close contact with someone suffering from such an illness
- If you have any illness or you are on any treatment that might make you vulnerable to infection

If you think any of these situations apply to you please declare this to the Research Office prior to the start of your placement.

If you wish to discuss this or if you would like any other health advice relating to your placement please contact the Trust Occupational Health Service, 028 95040401 and ask to speak to an Occupational Health Professional. **Your call will be dealt with confidentially.**

Signed by Placement Individual: _____

Date Completed: 13 August 2016

Follow up actions:

_____

Date Completed: _____

Signed by Research Office: _____

Date Completed: 22/8/16

Placement Individual:	Research Office to complete:
(Signature)	(Signature)
Anne Friel (PRINT NAME)	Alison Murphy (PRINT NAME)
Research Student (Pharmacist) (Role/Job Title) if appropriate	Research manager (BHSCT Role Title)
13 August 2016 (Date)	22/8/16 (Date)

Northern Health and Social Care Trust

www.northerntrust.hscni.net

Governance Department

Final Research Governance Permission

2 September 2016

Dr Beverley Lucas
Associate Dean Learning & Teaching
Faculty of Health Studies
University of Bradford
School of Pharmacy
Richmond Building
Bradford
BD7 1DP

Dear Dr Lucas

Study Title	How HCP's work to optimise medicines in acute hospitals NI
NHSCT Ref:	NT16-0514-06
IRAS project ID:	182436

I am pleased to advise that the Northern Health & Social Care Trust has given Final Research Governance Permission for the above project to commence. Permission is granted for the duration of the project to 31st December 2019.

The following documents have been approved for use in the project:

Document	Version	Dated
Study Poster	4.0	14 April 2016
Research Proposal	2.0	09 March 2016
PIS	1.0	07 March 2016
Consent Form	1.0	07 March 2016
Ethics Reviewer's Comments Form	2 (i)	22 April 2016
No ethics required from HRA		04 January 2016
Letter of Insurance expires 31/07/16 (received 09/06/16)		10 July 2015
Funding for Doctor of Pharmacy Course (received 09/06/16)		08 June 2016
Letter from sponsor (received 09/06/16)		26 May 2016
CV - Dr Beverley Lucas		02 December 2015
CV - Professor Alison Blenkinsopp		07 March 2016
CV - Ms Anne Friel		07 March 2016
GCP - Ms Anne Friel		20 February 2016
CV - Professor Mike Scott		Not dated
GCP - Professor Mike Scott		08 April 2015
Study Wide Governance Report		10 May 2016

Northern Health
and Social Care Trust

www.northerntrust.hscni.net

Conditions of Permission

Research Governance permission is issued provided the researcher(s) involved adhere to and abide by the conditions below.

- The researcher(s) must adhere strictly to the research protocol.
- There must be no changes to the research protocol or approved study documentation without the prior consent of the Trust, the Research Ethics Committee and, where applicable, the MHRA.
- Researchers must inform the NHSCT R&D Office if an extension to honorary contract is required for the duration of the study.
- There must be no changes in research staff without prior consent of the Trust.
- The Research Office should be informed if the Chief Investigator or Principal Investigator(CI/PI) is unable to continue to fulfil his/her duties as CI/PI for any reason such as long term absence, change in employment etc.
- There must be no increase in the resources required without prior consent of the Trust.
- Researcher(s) must report all untoward incidents and serious adverse events to the Trust.
- Any concerns in relation to the research protocol must be reported to the Trust.
- Researcher(s) must adhere to good research practice principles in line with the ICH Good Clinical Practice (GCP) guidelines.
- Researcher(s) must adhere to the Trust's Research & Development Standard Operating Procedures (available from the Research Office on request)
- On request, researcher(s) must make their research project available to Trust appointed monitors.
- The lead researcher must make an annual report to the Research Office for the duration of the project.
- The lead researcher should inform the Research Office on completion or termination of the project. Completion reports must be sent to the Research Office, Research Ethics Committee and, if applicable, MHRA.

Northern Health and Social Care Trust

www.northerntrust.hscni.net

The following personnel have been approved to work on the study at this Trust:

Name	Indemnity Provided by
Professor Mike Scott	NHSCT
Ms Anne Friel	WHSCT

Permission is granted subject to the attached conditions and I would ask you to please ensure that all members of the research team are familiar with these. Failure to abide by these conditions will invalidate permission and may result in the cessation of the research.

I wish you every success with your project.
Yours sincerely,

Dr Desmond Rooney
Head of NHSCT R&D

CC Professor Mike Scott, NHSCT
Ms Anne Friel, WHSCT
Miss Tamsin Holt, University of Bradford

Research & Development Office, Bush Road, Bush Road, Antrim. BT41 2QB
Telephone Number: 02894 424751

South Eastern Health and Social Care Trust

15/08/2016

Dr Beverley Lucas
University of Bradford
School of Pharmacy
Richmond Building
Bradford
BD7 1DP

Dear Dr Lucas

Study Title: How HCPs work to optimise medicines in acute hospitals in NI

HSC Trust Ref: SET/16/12(Please quote this number in all future correspondence)

IRAS Ref: 182436

I am pleased to advise that the South Eastern H&SC Trust has given Research Governance Permission for the above project to commence. Permission is granted for the duration of the project to 31/12/2019.

The following documents have been approved for use in the project:

Document	Version	Date
Research Proposal	1	09/03/2016
Poster	4	14/04/2016
PIS	1	07/03/2016
ICF	1	07/03/2016

The following personnel have been approved to work on the study at this Trust:

Name	Indemnity Provided by
Jill MacIntyre	SET
Anne Friel	University of Bradford

Permission is granted subject to the attached conditions which I would ask you to please ensure that all members of the research team make themselves familiar. Failure to abide by these conditions will invalidate permission and may result in the cessation of the research.

I wish you every success with your project.

Yours sincerely,

Research & Development Office 1st Floor, Home 3, Ulster Hospital, Dundonald, Belfast BT16 1RH
Tel: 028 9055 3101 Email: paul.carlin@setrust.hscni.net

South Eastern Health and Social Care Trust

pp

Mr Paul Carlin
Research Manager

Copy to: Anne Friel, Jill MacIntyre

South Eastern Health and Social Care Trust

Conditions of Permission

Research Governance permission is issued provided the researcher(s) involved adhere to and abide by the conditions below.

- The researcher(s) must adhere strictly to the research protocol.
- There must be no changes to the research protocol or approved study documentation without the prior consent of the Trust, the Research Ethics Committee and, where applicable, the MHRA.
- There must be no changes in research staff without prior consent of the Trust.
- The Research Office should be informed if the Chief Investigator or Principal Investigator(CI/PI) is unable to continue to fulfil his/her duties as CI/PI for any reason such as long term absence, change in employment etc.
- There must be no increase in the resources required without prior consent of the Trust.
- Researcher(s) must report all untoward incidents and serious adverse events to the Trust.
- Any concerns in relation to the research protocol must be reported to the Trust.
- Researcher(s) must adhere to good research practice principles in line with the ICH Good Clinical Practice (GCP) guidelines.

Research & Development Office 1st Floor, Home 3, Ulster Hospital, Dundonald, Belfast BT16 1RH
Tel: 028 9055 3101 Email: paul.carlin@setrust.hscni.net

- Researcher(s) must adhere to the Trust's Research & Development Standard Operating Procedures (available from the Research Office on request)

- On request, researcher(s) must make their research project available to Trust appointed monitors.

- The lead researcher must make an annual report to the Research Office for the duration of the project.

- The lead researcher should inform the Research Office on completion or termination of the project. Completion reports must be sent to the Research Office, Research Ethics Committee and, if applicable, MHRA.

Southern Health and Social Care Trust

Dr Beverley Lucas
Associate Dean Learning and Teaching,
Faculty of Health Studies
University of Bradford, Richmond Building
Bradford, BD7 1DP

Research & Development Office

30 June 2016 **Our Ref:** ST1617/08/IK/MMCA

Dear Dr Lucas

Study Title: **An investigation into how doctors, nurses and pharmacists work to optimise the use of medicines in acute hospital settings in Northern Ireland using a grounded theory approach.**
HSC Trust Ref: **ST1617/08** (Please quote this number in all future correspondence)
IRAS Ref: **182436**

I am pleased to advise that the Southern HSC Trust has given Research Governance Permission for the above project to commence. Permission is granted for the duration of the project to 31 December 2019.

The following documents have been approved for use in the project:

Document	Version	Date
Research Protocol		March 2016
Study Poster	4.0	14 April 2016
Participant Information Sheet	1.0	07 March 2016
Consent Form	1.0	07 March 2016

The following personnel have been approved to work on the study at this Trust:

Name	Indemnity Provided by
Dr Tracey Boyce	NHS/University of Bradford
Ms Anne Friel	NHS/University of Bradford

Permission is granted subject to the attached conditions which I would ask you to please ensure that all members of the research team make themselves familiar. Failure to abide by these conditions will invalidate permission and may result in the cessation of the research.

I wish you every success with your project.

Yours sincerely,

Miss I Knox
Research Manager

eCopy to:

Dr Tracey Boyce, Head of Pharmacy & Medicines Management, Southern HSC Trust – tracey.boyce@southerntrust.hscni.net

Miss Anne Friel, PhD Student, Head of Pharmacy & Medicines Management, Western HSC Trust – anne.friel@westerntrust.hscni.net

Research & Development Office Ramone Building Craigavon Area Hospital 68 Lurgan Road Portadown BT63 5QQ
Tel: 028 3861 4274 / 4275 Email: Irene.knox@southerntrust.hscni.net

Appendix 14 Examples of extracts of initial line-by- line codes for three interviews – a doctor, a pharmacist and a nurse

Interview 6	**Interview 7**	**Interview 8**
Doctor - 11 years' experience	**Older Peoples' Pharmacist Prescriber- 10 years' experience**	**Nurse- Ward Manager on Acute Admissions Unit - 3.5 years' experience**
Targeting admission.	Getting medicines right on admission.	Owning medicines trollies.
Assessing patients.	[Technician] highlights important work.	Administering at set times.
Clarifying and adjusting drugs.	Being aware of high risk drugs.	Managing the administration pipeline.
Reviewing patients daily.	Prioritising work in overall context.	Working in a structured system.
Making decisions in real-time.	Educating patients.	Being made aware of ad hoc doses.
Seeking specialist support.	Prescribing discharge medicines.	Ordering [medicines] up and then administering.
Planning for discharge.	'So from the very beginning to the very end' (*in vivo* code).	Developing pharmacy technician roles.
Focusing on compliance	Covering full patient stay.	Ensuring tablets

support.		are accessible [to administer].
Seeking alternatives routes of administration.	"If time permits" (*in vivo* code).	Using skill mix to improve flow.
[Pharmacists] having role in discharge.	Using time to do tasks.	Saving time.
Admission-related medicines review.	Fitting in the right things.	Working efficiently.
Admission-related prescribing.	Reviewing medicines at interfaces.	Serving medicines to patients, "we administer each tablet into our cups and taking it to the patient" *(in vivo* code).
Routine working.	Prioritising discharges.	Checking allergy status.
Writing up admitting drugs.	Focusing on medicines reconciliation.	Including the patient in checking process.
Leaving tasks to FY1s.	Making sure medicines are reconciled properly.	Using a standardised checking process.
Knowledgeable doctor not easily accessed.	"Although I have to prioritise discharges" (*in vivo* code).	Supervising medicines taking.

Asking questions of easily accessible doctor.	Using guidelines.	Opening dialogue on medicines.
[FY1] not attending ward round.	Putting the patient first – Medicines Optimisation.	Taking a practical approach to administering medicines.
Taking complexity into consideration.	Valuing patients' views.	Accessing ECR for baseline drugs.
Complexity influences working.	Incorporating what patients want.	Checking understanding with other professionals.
Aging, complex patients.	Adherence rather than concordance.	Freely querying prescriptions.
Weighing up risk/benefit.	Putting guidance into practice.	Getting it right.
Looking at the whole picture.	Improving communication skills.	“We are not afraid to ask” (in vivo code).
Reducing harm.	Working in a peer network.	Using BNF to prescribe.
Forward thinking.	Moving practice forward.	Correctly prescribing usually.
Rationalising medicines.	Actively de-prescribing.	Seeking advice from others.
Prescribing purposefully.	“To try to improve their life” (*in vivo* code)	Proactively addressing

		concerns.
Impact of condition on medicines choice.	Influenced by consultant practice.	Gaining knowledge through experience.
Multi-factorial influencing.	Learning from consultant experience.	Putting systems in place to reduce error.

Appendix 15 Interviews with Jayne and Sally (Doctor 2 and Doctor 3) – what is happening here?

What is happening here?	Getting the best for patients from the use of medicines. Doing the best job with what we have – knowledge, time. These senior doctors describe a very purposeful approach to prescribing medicines – being thoughtful, using their experience of medicines, using guidelines in the context of the patient to make decisions, seeking advice when its needed, listening to others, taking care, actively stopping medicines – thinking about what is best for that patient. And so it is important to have the right information available – information on how the patient is from the nurses, on the medicines the patient is on from the pharmacist and knowing how to get things done. Being able to look things up- having information available so that they do not have to rely on memory or make decisions with only some information. Engaging the brain so that the focus is on medicines – not a similar approach in all specialties. What happens when medicines are not proactively reviewed? Using medicines is a proactive process which changes with time as the patient's condition changes. So there has to be a proactive process to manage risk and get the best care for the patient. So we need to have things which make it easier to do well- information, people who can make things happen, and that's what it's all about- not relying on one professional to do everything with medicines but to support each other – being thoughtful about medicines. There is a complex interlinking system with interdependencies – making the best decisions about

	medicines in context of the patient, making sure that the patient gets the right drug on time, reviewing medicines – tying up loose ends as well. One big complex task with lots of different parts- needs people to pay attention to detail, to be able to do that and with more people involved does that take the pressure off the original prescriber when prescribing – knowing that someone else will pick that up? Knowing there are checks and balances in the system.
Who?	Middle and senior grade doctors. Pharmacists and nurses.
When?	Medicines review and prescribing is integrated into the daily review of patients.
Where?	On acute hospital wards.
Why?	Personally accountable for prescribing. Striving to get the patient better. Being responsible for patient safety. All hcps responsible for empowering patients. “The buck stops with you.” Preventing harm. “Prescribing is one of the few things we can twiddle with.” Benefiting patient outcomes.
How?	In built alarms, “I don’t rely on my memory”. Questioning, engaging my brain, thinking when prescribing, checking with the patient, taking care, focusing with experience, experience influencing

	decision making, using guidelines, de-prescribing, actively managing prescriptions, making conscious decisions, involving other team members – encouraging questions, auditing practice, asking specialists, seeking advice from pharmacists and nurses, looking at BNFs, taking complexity into consideration, taking lots of factors into account, rationalising medicines, being thoughtful and making purposeful decisions, pharmacists backing us up/ keeping us right, knowing how to get things to happen, seeing gaps, getting things done, sometimes there are problems when not enough information, for example, no BNF and a decision is made and almost left hanging – realise that you have created a problem for someone coming along later. Making the best out of a difficult situation, being thoughtful and reflective when prescribing.
With what consequences?	Providing safe patient care. Treating patients.

Appendix 16 Selective coding – integrating and refining the theory

Writing the storyline

I have given an example of a storyline written in April 2018 when I was trying to refine my theory. I found this a very helpful tool to use particularly when I was feeling overwhelmed by data and when I believed I was completely on the wrong track.

Writing the storyline 3.4.18

I revisited the data – the open codes and the integrative diagram for checks and balances. Looking at flow and narrative and asking more questions.

All participants described taking care of patients who are sicker than before (would have died in the past). These patients have a number of disease states and are taking a number of different medicines to treat them as well as preventative medicines. There are a greater number of medicines to choose from and therefore more medicines to know about and interactions – so there is potentially more risk in the system. There are also specialist medicines. The implication of using some of these medicines is that more help is needed for example district nurses and so prescribers need to understand the social context in which they prescribe as well as the side effects and evidence-base behind the drugs they prescribe. Nurses and pharmacists understand the wider implications of the use of certain medicines by virtue of their professional training and practice and so they fill the gaps and make sure that the right questions are asked. Their specific roles are dependent on prescriptions being accurate and appropriate for each patient and so they are almost forced into checking and asking questions and making sure they are right before they administer a medicine or clinically check a prescription and authorise it to be dispensed.

At the same time there is a lot more information available to healthcare professionals. A senior pharmacist mentioned this and the impact of it is that there need to be lots more pharmacists to access and check this information. Doctors describe learning on the job, looking things up when they get home,

using guidelines and asking experts and other healthcare professionals for advice. There were examples of junior doctors prescribing or transcribing drugs which they had little knowledge of for patients that they did not really know as they hadn't been on the ward round. IT systems are used more now, one junior doctor described that these facilitate shortcuts, for example, not taking a full drug history, but the information on the ECR may not be complete or fully accurate and so, especially on admission, the list of drugs prescribed may not be accurate. One nurse described there being lots of errors on prescriptions on admission and the pharmacist coming along to do a medicines reconciliation. So this is having a dedicated person who knows where to get an accurate medicines list and has a dedicated role to do this. And this makes it easier for and gives confidence to the nurse to administer medicines. Other things which give confidence in using medicines are asking the patient what they are taking or what has worked well for them in the past. They will tell the real story of the medicines which they have been prescribed but don't take and this information helps to get an accurate medicines list.

Senior doctors review patients each day. This includes a review of their medicines, a process which may differ between medical teams. Surgeons may only focus on the medicines which change because of surgery, for example, analgesics and antibiotics. Different medical teams may pay more or less attention to the detail of the medicines. The prescribing decisions made impact on the nurse's role and doctors described telling the nurse about these as soon as possible. One nurse spoke of a perfect system as being one when all of those prescribing changes had been made before the medicines administration round but was aware of the physical limitations of this. Doctors make prescribing decisions using a lot of information – guidelines, their experience of what has worked well in the past, the potential benefits to the patient, rationalising medicines, and thinking about the patient's quality of life. When they do not have all the answers they ask others, for example, nurses who know the patient, pharmacists who know the medicines and the patient and specialists who use particular medicines or treat specific diseases routinely. And all of this takes time and requires focus. And sometimes it is easy to lose focus so knowing that a pharmacist will

check your prescription and a nurse will query anything they are uncomfortable with before administering the drug all gives reassurance to the doctor. There are checks and balances in the system and these keep patients and other healthcare professionals safe.

The importance of having a plan for a patient's medicines on discharge is described by a junior doctor and a ward manager. The junior doctor will be tasked with writing the patient's discharge letter but does not really know the patient or been part of discussions of their care on the ward round. So the written plan is important for him to write an accurate discharge letter. He also does not have enough experience or knowledge of the social or other implications of the prescription. The pharmacist focuses on helping to produce an accurate discharge prescription as they are responsible for clinically checking it and making sure it is dispensed accurately. So their professional role depends on this and over time they improve their skills and knowledge of what to look for and the questions to ask to get this right. A senior doctor talked about pharmacists' magical skills and secret database which they used to sort out things. And so junior doctors, or anyone else, will rarely have the level of skills or knowledge or experience to write an accurate discharge letter as pharmacists have. So should pharmacists write the letter? Will junior doctors get deskilled? What do they need to know?

The increase in workload and busyness is recognised by everyone and pharmacists and nurses in particular have looked at ways of making things easier and safer. This includes working in structured ways, having acronyms, for example, 5 Rs and no more than three rules to act as a trigger for questioning a prescription. These professionals have also looked at where errors are made and have changed the way they work to help make things safer. This includes having a dedicated nurse to administer medicines. This person has one focus and should have minimal distractions. Pharmacy has introduced a range of different ways of working to make things easier and safer. These include having pharmacists on each ward who make sure the medicines are right on admission and discharge especially. These seem to be the points where more attention to detail needs to be paid. Pharmacists

only get to see the changes made to medicines during the patient's stay if they have time, if they are highlighted as critical drugs or queried by others. So pharmacists are working on the ward and are part of the ward team, helping to solve medicines problems as opposed to working in pharmacy and checking prescriptions by telephone. This makes it easier for everyone. Pharmacists have a dual focus however. They clinically check prescriptions on the ward but they also have a role in overseeing how medicines are stored and used on the ward in line with legislation and guidelines. Pharmacists described a tension between having two roles and belonging to two teams and feeling a greater sense of belonging to the ward team. Pharmacy technicians have also been introduced onto wards to make sure the medicines are available for nurses to administer, reducing missed doses. They also expedite supply of individual items and discharge medicines.

Pharmacists and nurses can now prescribe medicines and this helps to make things move more smoothly as well. They can know patients more and make prescribing decisions using not only their knowledge of medicines but also the wider knowledge they have by virtue of their professional roles and experience. They described being cautious prescribers but being able to correct prescriptions and provide a joined-up service which made a difference to patient care as opposed to leaving messages for junior doctors to change a prescription at a later time. So this improves efficiency, timeliness of administering the correct medicine and also gives the nurse or pharmacist a sense of making a greater difference to patient care. They describe bringing something extra to these prescribing decisions, "we are all about medicines', 'we see the whole patient."

Doctors, nurses and pharmacists speak to each other and to patients. Nurses are on the ward all of the time and know the patients best. They will know what support a patient needs to take medicines, how they feel when they take them, whether they need additional medicines to control symptoms and whether they can swallow medicines. They pass this information on to doctors to aid prescribing decisions. Nurses also need to know about medicines firstly from a professional practice perspective as they need to be

sure that the prescription is right and if they have any queries, ask questions either of the pharmacist or the prescriber. They also need to know about medicines so they can tell patients when they ask what this is for or does it have any side effects. Pharmacists describe coming along afterwards and checking that prescriptions are right. They carry out a medicines reconciliation when the patient is admitted and then get any changes made to the Kardex. The Kardex is often incorrect for a variety of reasons including, the prescriber used one information source (ECR) which may not be accurate, the prescriber didn't speak to the patient, the prescriber didn't have sufficient focus, the prescriber missed or prescribed drugs they were unfamiliar with resulting in an error, the prescriber knew that the prescription would be checked by someone later and that is their safety net. Pharmacists describe checking prescriptions and asking doctors why they prescribed certain drugs. They identify gaps and fill them; they tidy up discharge letters and make sure everything relating to medicines is correct at the point of discharge. They know the patient quite well as well and see prescribing decisions in the context of the patient as well as the guidelines. A pharmacist described feeling conflicted when looking at a prescription which did not fall within guidelines and having a duty of care to the patient to make sure it is right. One pharmacist liked to talk through her questioning process with another pharmacist to check out the validity and significance of her concern – like- minded people who take the same approach to medicines. Another pharmacist described needing to have all the facts when querying a prescription but also needing to approach different prescribers in different ways. She spoke about having to decide whether a drug being used outside a guideline was going to harm a patient and what were the implications of the prescribing decision. Pharmacists (and junior doctors) described knowing individual doctors' favourite drugs and understanding why they made particular prescribing decisions. They described being listened to. Doctors and pharmacists commented that pharmacists should be present when prescribing was happening as opposed to coming along after the event and asking questions.

Appendix 17 Memo - looking again at consequences (15.5.18)

I have gone back to the categories from the data which I have labelled as "consequences." In the most recent version of the theory I have one single consequence of *keeping everyone safe* which includes patients but also other healthcare professionals. This came from comments from nurses and pharmacists about sign-posting doctors to make certain prescribing decisions, filling the gaps in each other's knowledge but also in prescriptions (pharmacists tended to do this) and checking things out. It also came from doctors who recognised that other healthcare professionals played a big role in making sure patients get the right medicines and also "*have their [doctors] backs"*. However this consequence does not feel fully robust and I have gone back to the data.

What is happening here?

Healthcare professionals are not working to reduce harm but to make sure patients are treated well and getting the right medicines. Are they trying to protect patients? No- they are treating patients and trying to make sure that patients get the right medicines. The system is complex and there is a lot to do including routine work. They are trying to do the best they can to keep things safe. So they are using a variety of *checks and balances*, they are *working together* to keep patients safe and they are trying to change the system, developing professional roles, to ensure that they make the best use of resources and can do the best they can. So the consequences from the data are:

- *Ensuring each patient gets the right medicines*
- *Getting it right*

Is there a difference between *ensuring each patient gets the right medicines* and *getting it right*? *Getting it right* is about healthcare professionals doing a good job and using medicines accurately, safely and appropriately. Doing this leads to e*nsuring each patient gets the right medicines*. It is "each patient" because all healthcare professionals involved in this study described making decisions in the context of an individual patient, looking into the implications for that patient in the future of a decision made now and trying to make

decisions using the information available. Optimising medicines means putting the patient at the centre of decisions about medicines and whilst this specific term was rarely used, professionals did describe practice moving in this direction. Making the best use of resources is an approach to ensuring each patient gets the right medicine and can be incorporated into that. Therefore there is one integrated consequence which is:

- *ensuring each patient gets the right medicines*

Appendix 18 Framework for assessing research evidence

Framework for assessing research evidence- a quality framework (Spencer *et al* 2003)

	Appraisal Questions	Notes on the study being appraised
1	How credible are the findings?	Reflexivity, transparency and critical examination of evidence in light of the relevant theory provide credibility in qualitative research. I have positioned myself in my writing and analysis through my initial personal statement. The Findings describe how the Theory was developed from the data. Individual quotations are used and referenced. A rich, structured description is given of how the Theory emerged. A negative case (Mary) was disclosed. The findings of this study have been compared and contrasted with the recent literature and new statements made explicit. The findings were presented both to the University of Bradford Medicines Optimisation Research Group (April 2018) and to the Directors of Pharmacy in Scotland (August 2018). Feedback was that the Theory was credible.

2	How has knowledge/understanding been extended by the research?	Yes. This is the only research that I can find that produces a Grounded Theory of how doctors, nurses and pharmacists work to optimise medicines in acute hospitals. There are 7 statements of new findings which I believe extend the knowledge and understanding in this area.
3	How well does the evaluation address its original aims and purpose?	The evaluation identifies how doctors, nurses and pharmacists optimise medicines in acute hospitals by: • Evaluating the categories of the theory in light of the current literature • Providing a focus specifically on the roles of these healthcare professionals in optimising medicines • Reviewing recent research findings on inter-professional collaboration and comparing and contrasting with the outcomes of the study • Linking the outcomes of the study to the literature on medicines optimisation (albeit relatively sparse)
4	Scope for drawing wider inference – how well is this explained?	The transferability of the findings of a qualitative study is described in the methodology. The results section highlights that there were 17 participants. The strength of the theory lies in the robustness of the study design, data collection and analysis. A Grounded Theory (GT) also, “provides a framework for future research”

		(Creswell 2013).
5.	How clear is the basis of evaluative appraisal?	Clearly set out
6	How defensible is the research design?	The research design involves semi-structured interviews using Grounded Theory methodology. Clear justification of research methodology following review of methodologies and linked to aim of research. It follows a standardised approach (Strauss and Corbin 1998).
7	How well defended is the sample design/ target selection of cases/ documents?	Semi-structured interviews were carried out with 17 participants (including one pilot interview). Data collection and analysis in GT should continue until saturation is reached. No new data was coming from the latter interviews and I believe saturation was achieved. However, I would have liked to have interviewed some medical consultants and some more staff nurses in the study. I found it challenging to get volunteers. Also towards the end, some of the participants had worked/ were still working on the same clinical team. They all had experience of working in other teams beforehand. I see this as a positive and negative of the study as described in the Methodology, in which I defend the sample used. There is an argument that greater numbers of each professional group would have been needed if looking for saturation of each profession but the analysis was carried out as a homogeneous sample.

8	Sample composition/ case inclusion – how well is the eventual coverage described?	This is well-described in the Methodology.
9	How well was the data collection carried out?	The data was collected using semi-structured interviews using an outline interview template. This is described in the Methodology. Reflexive statements are made relating to this.
10	How well has the approach to, and formulation of, the analysis been conveyed?	In Chapter 3 I have described how I used a Grounded Theory approach to data analysis. In Chapter 4, I have clearly walked through each stage of the analysis of the data – using constant comparison, memo-ing and coding (open, axial and selective).
11	Contexts of data sources – how well are they retained and portrayed?	I have given a description of each participant in Table 2. Within the text I clearly identify the profession and gender of each participant when quoting from their interview.
12	How well has diversity of perspective and content been explored?	I have tried to highlight when data came from one, two or three professional groups as well as individual participants. I have included a negative case. I have compared and contrasted the views and roles of the participants and also discussed the difference between professionals operating with different levels of experience. In Table 2 I have listed the number of quotations I have used from each of the participants. I have tried to be balanced although one or two participants did not add much new data to the

		analysis towards the end of the collection period.
13	How well had detail, depth and complexity (*i.e.* richness) of the data been conveyed?	The data has been laid out using multiple quotations from participants. The interview structure changed over time as codes and categories emerged and I adopted a more purposeful approach.
14	How clear are the links between the data, interpretation and conclusions – *i.e.* how well can the route to any conclusions be seen?	The data are laid out a8nd discussed following the structure of the Grounded Theory, leading to conclusions. Individual conclusions are sign-posted in the discussion especially when they are believed to add to the knowledge of the subject.
15	How clear and coherent is the reporting?	I have tried to structure my work, using sub-headings where appropriate and balancing this with trying not to detract from incorporating categories and sub-categories into the Theory. I have used diagrams and tables to present some of the findings in a clear way. I have tried to use sign-posting. I asked a critical friend to read the thesis and advise on its clarity.
16	How clear are the assumptions/ theoretical perspectives/ values that have shaped the form and output of the evaluation?	Clearly outlined. Also see reflexive statement Appendix 1.

17	What evidence is there of attention to ethical issues?	Ethical considerations are laid out in detail in the Methodology. Trust(s) and University Research Ethics approval was sought and awarded. Participants were sent an information sheet on the study two weeks before their interview. They gave informed consent and also were given the opportunity to withdraw from the study at any stage. Participant anonymity was maintained and detail in quotations which could have identified individual was removed without changing the meaning of the data.
18	How adequately has the research process been documented?	I have documented the data collection and analysis clearly in Chapter 4. This includes quotations from each of the participants. I have retained memos, early codes and drawings as well as a researcher diary throughout the process. I have added the codes from each interview into an Excel spreadsheet for the sole purpose of ensuring that I have not missed codes.